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INTERAGENCY ADVISORY COMMITTEE ON WATER DATA

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Fiscal Year 1987

FEDERAL PLAN FOR WATER -DATA ACQUISITION

U.S. Department of the Interior
Geological Survey
Office of Water Data Coordination

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Fiscal Year 1987

FEDERAL PLAN FOR WATER-DATA ACQUISITION

Prepared by the
U.S. Department of the Interior
Office of Water Data Coordination
Reston, Virginia 22092

in cooperation with the
Interagency Advisory Committee on Water Data

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UNITED STATES DEPARTMENT OF THE INTERIOR

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SUMMARY

This report is prepared annually by the Office of Water Data Coordination in cooperation with the Interagency Advisory Committee on Water Data, as mandated by the Office of Management and Budget (OMB) Circular A-67, "Coordination of Federal Activities in the Acquisition of Certain Water Data."

The Federal Government's water data acquisition activities support scores of missions involving the Nation's water resources. Federal agencies are responsible for planning, designing, constructing, and operating water projects; river and flood forecast warning services; water supply planning; emergency response to critical water problems such as floods, droughts, and hazardous waste spills; water pollution control; international treaties and interstate compacts relating to water resources; and numerous other water resource functions. Federal expenditures associated with these water-related responsibilities, although difficult to quantify accurately, were approximately $6 billion in the 1985 fiscal year. This figure has been declining over the past several years.

Most agencies report that the need for water data continues to increase while Federal outlays for data remain relatively constant. Emphasis continues to be on more effective use of historical data, intensified interagency cooperation and coordination resulting in improved sharing of data and resources, and improved data management.

Total water data budget requests reported by Federal agencies for FY 1987 are slightly more than $200 million. This total appears to indicate a significant increase over FY 1986. Actually there is little real difference from FY 1986; the apparent increase represents a revised determination by the Environmental Protection Agency of how much of their total program actually involves water data acquisition as defined by OMB Circular A-67. It is important to note that budget figures reported are agency requests developed early in the budget process and actual appropriations may be different. The trend of decreasing Federal outlays for water data acquisition evident in the early 80's appears to have stabilized after small increases the last few years. Finding ways to reduce the cost of data collection continues to receive major attention by all agencies.

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Fiscal Year 1987
Federal Plan for Water-Data Acquisition

INTRODUCTION

Authority

The "Federal Plan for Water-Data Acquisition" is prepared each year as required by Office of Management and Budget (OMB) Circular A-67, paragraph 3b (Appendix A). Circular A-67 requires the Department of the Interior (DOI) to coordinate water-data acquisition activities of the Federal Government. Responsibility for this function is delegated by the DOI to the Office of Water Data Coordination (OWDC) within the U.S. Geological Survey (USGS). As part of the implementation of Circular A-67, the Secretary of the Interior established the Interagency Advisory Committee on Water Data (IACWD). The IACWD members represent Federal agencies that collect or use water data. The Federal Plan is prepared by OWDC in cooperation with the IACWD.

Purpose and Scope

The purpose of the Federal Plan is to provide information on water-data acquisition requirements, programs, and plans so that officials at various levels of government can use the information to analyze interagency water-data needs for Fiscal Year (FY) 1987. The Plan addresses interdepartmental issues and focuses on major Federal water-data acquisition concerns, but does not include program and budget details for individual agencies, which are provided in budget justifications prepared by the agencies themselves. The primary intent is to highlight relationships between agencies that cooperate to meet Federal water-data responsibilities, describe coordination activities, and, in addition, to give a brief background on non-Federal participation in the national water-data acquisition system.

This Plan provides an overview of Federal water-data acquisition activities, documents coordination mechanisms, and discusses agency needs for water data. Program changes and new directions required to effectively meet varying water-resources information needs in the United States are described, and estimates of the magnitude of resources required to support needed programs are provided. The Plan also documents information needs that must be recognized in short- and long-term planning.

OVERVIEW OF MAJOR FEDERAL WATER-RESOURCES RESPONSIBILITIES

The scope of Federal responsibility in developing, managing, and regulating water resources and water-related programs is extremely broad, and in FY 1985, Federal expenditures related to water exceeded $6 billion. To meet the requirements of legislative mandates and other laws and directives, more than 30 Federal agencies use water-resources data to accomplish their missions. In addition to agencies whose normal activites are related closely to water

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resources, many Federal agencies also need water-resources information for special applications. For example, some agencies use water information in economic analyses of agricultural and industrial needs.

Major Federal water-related responsibilities can be grouped under the following subjects: water-resources projects; public river-flow and water-supply forecasting; emergency response; pollution control; natural-resources management; treaties and compacts; and data collection, investigation, or research.

Agencies associated with each responsibility are identified in Table 1, and the type or categories of data required by the various agencies are shown in Table 2. Programs and plans of individual agencies are described briefly in Appendix B.

Federal agencies cooperate to collect water data by requesting hydrologic data collection and investigations on a reimbursable basis from the USGS and each other. For example, other agencies transferred about $40 million to the USGS in FY 1984. The Corps of Engineers (COE) transferred the largest amount, $15 million, most of which was for data collection. Many other agencies exchange data routinely. For example, National Weather Service (NWS), Tennessee Valley Authority (TVA), Bureau of Reclamation (BOR), and COE share data for forecasting and reservoir regulation.

Data collected under Federal arrangements are normally stored for future use by the entire water-resources community. This large data-user service is made possible through the cooperative efforts of Federal and non-Federal organizations that help maintain the national data system. Some Federal agencies can obtain needed data entirely through other sources. For example, the Federal Emergency Management Agency, the Department of Housing and Urban Development, and the Council on Environmental Quality are able to obtain water data without establishing in-house collection programs. Many agencies can operate smaller in-house data-acquisition programs because the bulk of their requirements are met through cooperative programs and data sharing. Examples are the National Park Service (NPS), NWS, Bonneville Power Administration, and the Fish and Wildlife Service (FWS). In-house programs are established when special requirements cannot be effectively or economically met using existing sources.

Hydrologic data activities are indexed by the National Water Data Exchange (NAWDEX) so that the data can be shared. NAWDEX is a consortium of over 250 water-data users and collectors--Federal, State, and local governments, and the private sector. The program is managed by the USGS in support of data sharing and user services.

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Table 1--Major Federal Water Resources Responsibilities, By Agency

Department/ Agency	Responsibilities						
	Water Projects	Public Forecasting	Emergency Response	Pollution Control	Natural-Resources Management	Treaties and Compacts	Data Collection, Investigation or Research
Agriculture							
ARS							X
ERS							X
FS				X	X		X
SCS	X	X		X	X		X
Commerce							
CEN							X
NOS		X					X
NWS		X					X
Defense							
COE	X		X	X	X	X	X
Energy							
BPA					X		X
DOE				X	X		X
FERC	X		X	X	X		
Interior							
BIA	X			X	X	X	X
BLM				X	X		X
BOM				X	X		X
BOR	X		X	X	X	X	X
FWS			X	X	X		X
USGS			X			X	X
NPS				X	X		X
OSM				X	X		X
Transportation							
FHWA				X			X
Independent Agencies							
CEQ							X
EPA	X		X	X			X
FEMA			X				
IBWC	X		X	X		X	X
IJC				X		X	X
NRC			X	X			X
TVA	X		X	X	X		X

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Table 2--Overview of Categories of Data Needed by Federal Agencies

Department/ Agency	Data Categories												
	Surface Water	Ground Water	Quality of Water	Water Use	Environmental Assessment	Management Effects	Basin Studies	Real-Time and Remote Sensing	Instream Use	Water Rights	Flood	Energy	Nuclear
Agriculture													
ARS	X	X	X	X	X	X	X	X					
ERS	X	X	X	X		X	X		X	X			
FS	X	X	X	X	X	X	X	X	X	X	X	X	
SCS	X	X	X	X	X	X	X	X	X		X		
Commerce													
CEN				X									
NOS	X							X			X		
NWS	X	X						X			X		
Defense													
COE	X	X	X	X	X	X	X	X	X	X	X	X	
Energy													
BPA	X			X	X			X				X	
DOE	X	X	X	X	X	X	X					X	X
FERC	X		X	X	X	X	X				X	X	
Housing and Urban Development	X	X	X	X	X						X		
Interior													
BIA	X	X	X	X	X	X	X	X	X	X	X	X	
BLM	X	X	X	X	X	X	X	X	X	X		X	
BOM	X	X	X	X	X		X					X	X
BOR	X	X	X	X	X	X	X	X	X	X	X	X	
FWS	X	X	X	X	X	X	X	X	X	X			
USGS	X	X	X	X	X	X	X	X	X	X	X	X	X
NPS	X	X	X		X	X			X	X	X		
OSM	X	X	X	X	X	X	X		X			X	
Transportation													
FHWA	X	X	X		X	X					X		
Independent Agencies													
CEQ	X	X	X	X	X	X	X	X	X			X	
EPA	X	X	X	X	X	X	X	X	X			X	X
FEMA	X	X	X	X				X			X		
IBWC	X	X	X	X				X	X		X		
IJC	X	X	X	X	X	X	X	X	X	X	X	X	X
NRC	X	X	X	X	X	X		X			X	X	X
TVA	X	X	X	X	X	X	X	X			X	X	X

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COORDINATION ACTIVITIES

Federal Agencies

One of the most visible and historically effective vehicles for coordination among Federal agencies is the Interagency Advisory Committee on Water Data (IACWD). The IACWD, composed of all Federal water agencies, represents the interests of these agencies in acquiring and using water data. The Committee meets at least annually; the most recent meeting was October 16-18, 1985. A brief summary of that meeting follows.

Interagency Advisory Committee on Water Data, Meeting of October 16-18, 1985

Guest presentations were given by Mr. Doyle Frederick, Associate Director, USGS; Mr. Charles Dean, Jr., Chairman, Board of Directors, Tennessee Valley Authority (TVA); Ms. Judy Campbell Bird, Ground Water Program Director, Environmental and Energy Study Institute; and Dr. William Walker, member, Advisory Committee on Water Data for Public Use (ACWDPU); and Director, Water Resources Research Institute, Virginia Polytechnical Institute and State University.

Mr. Frederick acknowledged the past accomplishments of the IACWD and its subcommittees, and challenged the individuals involved to be innovative and industrious in water-data coordination efforts. Mr. Frederick expressed the personal opinion that the charter for the Committee, i.e., OMB Circular A-67, gives considerable latitude to the administering agency (Department of Interior) to coordinate Federal agencies over a wide spectrum of water-data and information activities. He urged the Committee to not be bound unwisely by tradition or self-imposed constraints in meeting burgeoning coordination needs.

Chairman Dean, of TVA, described TVA as a unique governmental body with a broad mission of economic development that necessitates attention to every aspect of water use, conservation, and study. He noted that TVA has abandoned some data stations, but stressed that this action is strictly the result of a severe budget crunch and in no way symbolizes a deemphasis of TVA interest in water-data programs and water-data coordination activities. In response to a question, the Chairman stated that TVA has an interest in ground water but does not have an actual ground-water protection program.

Judy Campbell Bird spoke about her recent experiences in conducting public meetings in various regions of the United States as part of a program of the Environmental and Energy Study Institute to develop alternatives for ground water protection and to present these alternatives to the U.S. Congress. She said that her regional audiences, representing generally non-Federal and private interests, are aware of data needs and are very supportive of programs such as the data and investigations programs of the USGS. But, something more is urgently needed: more assistance in acquiring water data and assistance from the water-data and investigative agencies in actually working on water

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problems. She said that the regional responses (including industry) are showing a strong demand for national drinking water standards to complement State and local efforts.

Dr. William Walker spoke as a member of the ACWDPU, the non-Federal Committee, and summarized the activities and results of the San Diego meeting of that Committee.

Six speakers discussed data-intensive programs selected for discussion because of relevance, scope, or difficulty of accomplishment. Mike Matthews, of TVA, discussed the efforts of TVA in ground-water education. Norbert Dee, senior scientist, Environmental Protection Agency (EPA), gave a status report on the National Ground Water Protection Strategy. He emphasized the importance of cooperation with the Department of the Interior, particularly the USGS, and stated that EPA has no need or interest in duplicating the data-collection and handling capabilities of the USGS. He emphasized the necessity of quality control of data entered into STORET and rigorous data management (to avoid the problems of "lost data," as in Superfund).

David Rickert's (USGS) presentation on the National Water Quality Assessment Program (NAWQAP) included information on preliminary results of a USGS study and evaluation of water-quality data holdings in the States of Ohio and Colorado. In response to a question, Donald Leifeste (OWDC, USGS) explained the criteria used for selection of these States for pilot studies. Following the NAWQAP discussion, Council on Environmental Quality (CEQ) representative, William Mills, commented that he appreciates the need for data collection, but would like to know where he could get help now in answering the pressing question of "How safe is our Nation's water?" He stated that people are not willing to wait for more data collection. The Associate Director of the USGS, Doyle Frederick, and David Rickert responded to Dr. Mills' oral remarks with a statement of recognition of the validity of Dr. Mills' concerns and an explanation of the need for substantial improvement in characterization of the Nation's water quality. Michele Leslie, Office of Policy Analysis, Department of the Interior, commented on the need for extensive review of the NAWQAP program with the objective of influencing beneficially the ultimate structure and content of the fledgling program.

Several members expressed their appreciation for receiving a written synopsis of NAWQAP and urged that the Committee be used for coordination of the water-data aspects of NAWQAP.

Lewis Moore, U.S. Bureau of Reclamation (BUREC), discussed progress in the interagency study underway to evaluate the need, means, and impact of improved water-data collection in wilderness areas.

Earl Eiker, COE, presented an overview of the role of the COE in providing streamflow data, noting that data collection is not the Corps' primary role. Mr. Eiker expressed an understanding of the role of the USGS and cited the "excellent joint effort" of the two agencies to resolve problems of maintaining the public record of streamflow under reduced budgets. Tom Buchanan, USGS, commented on the importance of the Corps' support of maintenance of

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national data networks and on attempts to get funding from other users of water data, in instances where the Corps' budget falls short.

Susan Zevin, NWS, gave a report on the progress of the COE and the NWS in examining the feasibility of joint forecasting activities for these two agencies.

OWDC staff reports were given by Ed Imhoff, Don Leifeste, Doug Manigold, and Bruce Parks to describe activities in information product preparation and distribution, headquarters and field coordination, and technical investigations of information bases and acquisition processes.

Highlights of annual reports by subcommittee chairpersons, or their representatives, were presented. Complete annual subcommittee reports follow this meeting summary.

Daniel Muller, Bureau of Land Management (BLM), led a panel discussion that considered water-data needs for public land management, national forest management, mined-area reclamation, and determination of Indian water rights. Dan and Warren Harper (Forest Service) emphasized the complexity of water-data needs for Federal lands and asserted that Federal land managers must be involved in the design of national network programs which affect Federal lands. Allen Perry, Office of Surface Mining (OSM), described the distribution of water-data collection and handling responsibilities to the individual States as conditions which, if not monitored intelligently, could lead to nonuniform methods and diverse data bases. Maria Mendoza, Bureau of Indian Affairs (BIA), discussed the activities underway by BIA and by the various Indian tribes to determine Indian water rights.

Maria acknowledged that although considerable water data has been collected under the auspices of Indian tribes, these data are generally considered as proprietary by the tribes and thus are unavailable for public use.

The following conclusions and recommendations were made:

1. Acting upon recommendations from members for more formal involvement in planning the annual meetings of IACWD, the Alternate Chairman appointed an ad hoc committee on agenda for the fall meeting of 1986 and asked that this committee report recommendations to the Chairman by May 1, 1986. The committee members are:

   Donald Leifeste, U.S. Geological Survey, Chairman
   Roy Boyd, Bureau of Reclamation
   Norbert Dee, Environmental Protection Agency
   Earl Eiker, Corps of Engineers
   Tom Nicholson, Nuclear Regulatory Commission

2. The Committee endorsed a recommendation by the Chief, OWDC, that the office, in its role as an executive secretariat for A-67, report annually (on an FY basis) in writing to the IACWD on the annual activities of OWDC, including specific handling and disposition of recommendations and questions of the IACWD.

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3. Several Committee members urged that the IACWD be utilized for coordination of the interagency water-data aspects of such major studies as the National Water Quality Assessment Program which has been proposed by the USGS.

4. Member agencies should encourage the National Environmental Satellite Data and Information Service (NESDIS) to seek additional funding for the full GOES Data Collection System upgrade.

5. Agencies budgeting for data-collection networks are urged to improve awareness of the full costs of successful establishment and maintenance of these networks. Programs (particularly multiagency initiatives) are usually underfunded for maintenance of equipment, new software, personnel training, and data management.

Subcommittee on Hydrology

The mission of the Subcommittee on Hydrology (HSC) is to foster information exchange and to develop and recommend procedures for coordinating and standardizing hydrologic and hydrometeorologic activities of multiagency interest, giving special attention to hydrologic procedures and techniques needed in the development and improvement of Federal policies and procedures pertaining to water and related land resources planning.

Information of interest to the Federal hydrologic community is exchanged at each meeting. In addition, a program of special presentations was initiated in FY 1985. At the June 4, 1985, meeting, Mr. Alan Lumb of the USGS gave a special presentation entitled "Watershed Data Management Systems." On October 1, 1985, Mr. Donald Newton of TVA presented TVA's development of a hydrologic and flood damage model for Huntsville, Alabama. The special programs were very informative and will be continued in FY 1986.

The HSC had a productive year with six work groups in session. The Satellite Telemetry Interagency Working Group was initiated during the year, and Flood Warning Systems was made a standing work group. A summary of the activities of each work group follows.

Standing Work Groups

Hydrologic Radio Frequency Coordination
Chairman, Allen Flanders, National Weather Service

Flood Warning Systems
Chairman, William Judkins, Federal Emergency Management Agency

Satellite Telemetry Interagency Work Group
Chairman, Lewis Moore, Bureau of Reclamation

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Ad Hoc Work Groups

Small Urban Watersheds
Chairman, Dan Cotter, Federal Emergency Management Agency

Probability of a Probable Maximum Flood
Chairman, Marshall Hansen, National Weather Service

Review of Bulletin 17B
Chairman, Roy Huffman, Corps of Engineers

The Flood Warning Systems Work Group has completed and published a report entitled "Guidelines on Community Local Flood Warning and Response Systems, August 1985" and was dissolved upon publication of this report. In recognition of continued interest in local flood-warning systems, a new standing work group was formed. The new work group will meet about four times each year and concern itself with the following:

- review of local flood-warning system standards and evolution of new or revised standards
- organization of an interagency forum of lessons learned from failures
- coordination of research and development for local flood-warning systems
- information exchange concerning local flood-warning systems

The new standing work group plans to cosponsor seminars in March and June 1986.

The Satellite Telemetry Interagency Work Group (STIWG) is jointly sponsored by the Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR) and the IACWD. STIWG will report directly to the Committee for Basic Services (CBS) and the Hydrology Subcommittee. The STIWG will be responsible for advising CBS and the Hydrology Subcommittee (HSC) on matters concerning satellite telemetry user requirements relating to hydrologic, meteorologic, oceanic, and other environmental data; promoting current information exchange including data sharing, research and development results, and other technical information among agencies; and will undertake projects at the direction of either CBS or the HSC. The work group is presently pursuing full suppport for, and development of, the Wallops Island Geostationary Operational Environmental Satellite direct readout ground station.

During the past year (FY 1985), the work group on the Probability of a Maximum Flood effectively completed its task. A draft report was prepared and distributed in August 1985 for agency review. The essential conclusion is that, of the available techniques to establish probabilities, none presents a method that reliably and consistently determines the probability of a probable maximum flood within definable confidence bands. Furthermore, the literature supports the position found in most hydrologic practice to limit extrapolation of frequency distributions to twice the length of the flood record. Once agency

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reviews of the draft report have been completed, the work group will meet to address the comments received, and work toward publication of the report.

Due to resource constraints, the Small Urban Watersheds Work Group has restructured and redirected its program. After carefully considering several possible courses of action, a decision was made to survey organizations experienced in hydrologic modeling. Results of this survey will be used to develop an annotated bibliography on hydrologic methods commonly used to analyze flood flow frequencies for small urban watersheds. The annotated bibliography will provide information on models in common use, rather than guidance.

The original concept of the Bulletin 17B series (first published in March 1976 and last revised March 1982) was that the Bulletin would be reviewed and revised when warranted by experience, and by examination and testing of new techniques. Accordingly, the Bulletin 17B Work Group sent a questionnaire, to Federal users and, based on collective experience and the questionnaire review, concluded that Bulletin 17B should not be revised at this time because substantial problems and compelling new techniques have not been identified. Also, the present work group should be abolished upon completing its report. A new work group should be formed to develop a series of pamphlets covering selected subjects, such as partial duration, multistation comparison, and diagnostics.

Subcommittee on Ground Water

This Subcommittee consists of representatives from 13 member agencies. It has begun to reap the fruits of its labor since its reformation in 1983. Two major Subcommittee projects begun in FY 1984 are nearing completion, and one begun in FY 1985 is proceeding well.

The "Federal Ground Water Projects Directory" is a joint effort between the Subcommittee and OWDC. All Federal agencies had been asked to provide a formatted summary of active ground-water projects to OWDC for entry into a computer data base. These summaries included project title, project leader, appropriate agency and location designators, keywords, problem statement, objective, and approach. While the entire data base is accessible through NAWDEX, the Subcommittee feels that a condensed version in hard-copy form would also be beneficial, as well as in accordance with the mission statement of the Ground Water Subcommittee. The Subcommittee determined that an abbreviated project format containing title, location and agency, investigator, key words, and project objectives would be the most valuable information for circulation. The report in this format is now in the final stages of editing and will be distributed in January 1986. Agencies which have not submitted this information are encouraged to contact OWDC, as revision of this report will be a continuing Subcommittee effort.

Under the leadership of Subcommittee member Thomas Nicholson (NRC), substantial progress has been made in preparation of a glossary of selected ground-water terms related to contaminant transport processes. In FY 1985, a task

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force was formally organized to oversee the project. A core group of agency-designated representatives from the Agricultural Research Service (ARS), BUREC, EPA, NRC, and USGS was formed to develop and finalize the glossary. Tom Nicholson and Gerald Meyer (USGS) are co-chairman of the group. For review purposes, a number of corresponding members of the task force were also designated; these include all members of the Ground-Water Subcommittee. The core group met in May to review the submitted draft and terms of reference and to incorporate review comments. A second meeting of the glossary working group met in September to review and incorporate Federal and non-Federal reviewers' comments on the May draft. The present draft reflects this review and will be subsequently reviewed by the Ground-Water Subcommittee.

As its January 1985 meeting, the Subcommittee arranged a panel discussion on "Sampling Subsurface Water for Water Quality Analysis." Representatives from ARS, EPA, NRC, and USGS spoke on various aspects of the topic. As a direct result of this meeting and subsequent contact with the American Society of Testing and Materials (ASTM), the Subcommittee was given responsibility for the program of the opening half-day session at the upcoming ASTM Symposium on Field Methods for Ground-Water Contamination Studies and Their Standardization, February 1986. The Subcommittee has decided to repeat the format of its in-house meeting, with lead speakers from USGS, EPA, and SCS, and a following panel discussion adding representatives from ARS, NRS, BUREC, and ASTM. The topic of the session will be "Federal Efforts to Improve Field Methods for Ground-Water Contamination Studies."

Subcommittee on Sedimentation

Subcommittee members obtained summaries of sedimentation work in progress or planned by their agencies, important findings, new methods and publications, laboratory and research activities, and other pertinent information for submission to the Office of Water Data Coordination and incorporation into the "1984 Sedimentation Notes."

The Fourth Interagency Sedimentation Conference has been scheduled for March 24-27, 1986, in the Riviera Hotel, Las Vegas, Nevada. The theme selected is "Sedimentation--Friend or Foe: What does the Future Hold?" Eighty technical papers will be presented by representatives of 11 Federal agencies in 2 concurrent sessions with open discussion periods after each presentation. Twenty-nine additional papers will be presented during two poster sessions. A panel of distinguished experts will also explore the subject of adverse effects of sedimentation processes on the environment.

Assistant Secretaries for the Departments of the Interior, Agriculture, and Army as well as the Director of the U.S. Geological Survey have accepted invitations to speak during the opening day of the Conference. The dinner speaker will be the Chief Engineer for the People's Republic of China's Yellow River Conservancy Commission.

The Federal Interagency Sedimentation Project is another Sedimentation Subcommittee-sponsored project. Funding for this project has been uncertain for the past several years. Activities of the project have been scaled down

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and the project has not been able to adequately respond to many of the needs of the participating agencies. This fiscal year, the contributing agencies have increased their funding levels to support the project and maintain its present level of activity.

Subcommittee on Water-Use Information

The major focus of activity during this period was the initial development of the water-use chapter of the "National Handbook of Recommended Methods for Water-Data Acquisition." The Subcommittee also exchanged information on analytical or regulatory water-use related programs and provided comments to the Census Bureau's Agriculture Division on proposed changes and reductions to both the 1987 Census of Irrigation and the farm and ranch irrigation survey.

Subcommittee on Water-Data and Information Exchange

This Committee's work continued to focus primarily on recommendations forwarded to the Subcommittee from the interagency workshop on Hydrologic Models Applicable to Water-Supply Forecasting that was held in Denver in FY 1984. The following actions have been taken by the Subcommittee on several of the recommendations reported on at last year's IACWD meeting on these issues:

1. Adopt the Standard Hydrometeorological Exchange Format (SHEF) for data exchange among Federal agencies.

   The SHEF Technical Work Group was assigned the permanent role of coordinating and developing SHEF for interagency use. With the assistance of OWDC, a canvass was made of all Federal agencies in January 1985 to acquire information about additional data elements that should be added to SHEF to satisfy interagency requirements and the addition of agency-specified identifiers for data elements that already exist in SHEF. The results of this canvass were presented to the Work Group for action in May 1985. These additions are currently being included in Version 2.0 of SHEF, and they are expected to satisfy the specified interagency requirements. In the interim, an update of the SHEF format (Version 1.1) was released by the National Weather Service in January 1985, and a new SHEF Field Office Users Handbook was released in May 1985. Copies of the SHEF decoder software are also being made available on magnetic tape for distribution to other agencies.

2. Adopt a standard automated data exchange communication protocol.

   As previously reported, the development of a standard automated data exchange communication protocol is considered by the Subcommittee to be a critical issue. In lieu of establishing a new working group, it was concluded by the Subcommittee that the SHEF Technical Work Group was a suitable technical forum for considering this issue. The "Standard Telecommunications Procedures for Data Exchange Among Automated Water Information Systems" developed by the Office of the Federal Coordinator for Meteorological Services and Supporting Research (IFCMSSR) proposing

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the adoption of portions of the X.25 protocol as a standard has been referred to the work group for consideration. The work group is expected to consider several protocols before a final recommendation is made.

3. Access to hydrometeorological data should be significantly improved.

   The Subcommittee is proceeding with its proposal to sponsor a workshop of appropriate Federal data managers to address this issue. The workshop will be held in conjunction with the Second International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology sponsored by the American Meteorological Society and other agencies in January 1986. The workshop will focus on the resolution of existing problems in data exchange. A workbook on available data systems will be developed as part of the workshop. Speakers will give papers on all major Federal data systems related to water data, and exhibits at the conference will include the data systems of the NWS, SCS, and USGS.

4. Develop a standard format for the exchange of graphic products.

   A list of graphic standards in use by member agencies of the Subcommittee was prepared in February 1985. After much discussion, the decision was made not to proceed with the development of a standard format for the exchange of graphic products. This decision was based on the many diverse products available which make standardization difficult, if not impossible, and the dynamic growth currently being experienced in the graphics software industry. While standards may be developed for a small range of specified products, the Subcommittee does not believe that the development of a generalized standard is possible at this time.

5. Implement an interactive station location and parameter file that is easily accessed and updated.

   Work group members are currently involved in completing an inventory of automated indexes of hydrometeorological data by Federal agencies. A small work group of Subcommittee members will be asked to develop an opinion on the conjunctive use of existing indexes and the need to develop a new index to facilitate the identification of and access to hydrometeorological data on an interagency basis.

Subcommittee on Automated Data Systems

The Subcommittee was established to coordinate the development of automated hydrologic data acquisition systems and to ensure compatibility of such systems. This provides agencies with the opportunity to share in development costs, proposal review and contract monitoring, system testing and evaluation, and contracts. Typical information that has been shared among the nine member agencies is summarized below:

Tha National Ocean Service (NOS) is upgrading its national water observation network, which supplies water level data in the Great Lakes and tide data

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along ocean coastal regions for boundary determinations, tsunami forecasting, and tide forecasting. NOS began tests in September of the Next Generation Water Level Measurement System prototype at Duck, North Carolina. The Corps of Engineers and NWS are participating in these tests.

TVA is installing three pilot sulfur dioxide monitoring platforms that will allow air monitoring from coal burning plants in real time. They plan to install 55 additional data collection platforms. TVA also operates a network of over 300 sites where solar water heating and wind energy data are monitored at 1-minute intervals from solar homes.

The Corps of Engineers is chairing an interagency working group to develop a standard transmission format for GOES self-timed data collection platforms. A draft report on the subject has been unanimously agreed to by representatives of participating agencies and is being circulated to agency heads for endorsement. Adoption of this format will eliminate many of the 28 platform formats that now exist which make interagency exchange of data very difficult.

NWS has developed and successfully field tested a Limited Automatic Remote Collector (LARC). The LARC is a solid-state, battery-operated instrument designed to store and monitor water level and precipitation data. Data can be retrieved on-site or remotely by telephone; the system also has a voice synthesizer option. It also can be programmed to originate the telephone transmission when a programmed limit has been reached. TVA provided assistance in the development of this system.

The USGS is continuing development of the Adaptable Hydrologic Data Acquisition System (AHDAS). Twenty prototypes of the field components are scheduled for delivery in late spring or early summer of 1986. A formal AHDAS field test plan has been prepared for Arizona, North Dakota, Pennsylvania, and Florida.

EPA is investigating methods for monitoring non point sources of pollution into streams, such as feed lots, farmer's fields, and small towns, and are looking for ways to sample flow into stream beds from the water table. EPA is also making use of the USGS Hydrologic Instrumentation Facility in Bay St. Louis, Mississippi.

The Bureau of Reclamation is interested in placing instrumentation in wilderness areas. A contract has been awarded for determining the effects of these data on hydrologic forecasts. This will be helpful in obtaining permission to place much needed instrumentation in wilderness areas. A current area of particular interest is the Upper Colorado River Basin where a multiagency data network is being installed.

ARS is using Nuclear Magnetic Resonance (NMR) techniques to measure soil moisture, whereby magnets are mounted on a tractor and pulled through a field to determine NMR. The goal of using this technique is to apply NMR as ground truth for spectrometers mounted in aircraft. Another application is to determine the water holding capacity of the soil from free induction decay. Experiments are being conducted on the Eastern Shore of Maryland.

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SCS is planning a Field Office Conservation System (FOCUS), which will provide 3,000 offices with improved computer capabilities. The program will be operated in conjunction with the Farmer's Home Administration facilities. Each station will include conservation planning and applications work for a specific county's data.

Many agencies rely on the GOES DCS for the relay of hydrologic data. To expand the system, NESDIS has developed specifications for a DCS upgrade. Their 1986 budget contains $3.9 million for the hardware and software upgrade, which provides for about half the projected need. No initiative was put forward in FY 1987. Member agencies should encourage NESDIS to seek additional funding for the full DCS upgrade.

Hydrologic networks funded by multiagency initiatives must also be addressed. The systems currently in use are worthwhile and indicate that the taxpayer's dollar is being spent effectively through cooperation. However, the Committee is concerned that most planning involves the relatively easy part, which is procurement of equipment. Insufficient planning goes into the remainder of the life cycle of the network such as spare parts, maintenance policies, training, coding and formatting of data, dissemination of data, operations and maintenance costs, and impacts on other programs both within and outside the agency. The Subcommittee encourages review of multiagency initiatives at the draft stage rather than after a program development plan is published.

Non-Federal Agencies

Non-Federal participation in the water-data coordination program is spearheaded by the Advisory Committee on Water Data for Public Use (ACDPU). This Committee is composed of private citizens, selected for their individual knowledge and involvement with water resource issues, and representatives of professional societies, water-interest organizations, State agencies, and the academic community. The ACWDPU meets at least annually; a summary of the last meeting follows.

Advisory Committee on Water Data for Public Use, Meeting of April 23-24, 1985

The eighteenth meeting of the Advisory Committee on Water Data for Public Use (ACWDPU) was held April 23-24, 1985, in San Diego, California. Dallas Peck, Director of the U.S. Geological Survey (USGS), chaired the meeting, which was attended by 50 representatives from national, State, and professional organizations, and the Federal Government. Wayne Marchant, Acting Deputy Assistant Secretary for Water and Science, Department of the Interior, provided a luncheon address on April 23.

The meeting was devoted to three major topics for discussion: (1) The Role of the Geological Survey in a Rapidly Expanding Ground-Water Protection Environment; (2) Maintaining the Integrity of the Nation's Streamflow Data Base; and (3) Improving the Integrity of the Nation's Surface-Water Quality

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Data Base. Marshall Moss, of the USGS, also summarized administration of the Water Resources Research Act of 1984.

Philip Cohen, Chief Hydrologist of the USGS, moderated panel discussions on streamflow, ground-water protection, and water quality, and workshops were held on these three topics. Advisory Committee members who served as panelists and workshop chairmen were Kenneth Schmidt, representing the American Water Resources Association; John Welton, representing the American Society of Civil Engineers; and William Walker, representing the Universities Council on Water Resources Research.

In addition to Advisory Committee members, panel speakers included: Edwin Clark of the Conservation Foundation, Fred Leutner of EPA, Vern Hagen of COE, Harvey Doerksen of the Council on Environmental Quality, Lee Larson of NWS, and representatives of the USGS.

Major recommendations of the Advisory Committee are summarized below:

A. In cooperation with EPA and others, as appropriate, USGS should (1) develop training programs for scientific aspects of ground-water protection; (2) design and implement a program for determining the extent of ground-water contamination in the United States; (3) develop and evaluate alternative techniques for installing and sampling ground-water monitoring wells in various hydrogeologic settings; and (4) develop better methods for monitoring the vadose zone.

B. USGS should develop a 20-year plan for streamflow data collection. The plan should explore sources of funding, including private sector support, for maintaining and expanding the streamflow data collection program.

C. In cooperation with EPA and others, USGS should develop a multifaceted program for assessing the quality of the Nation's water. The program should follow an iterative search philosophy that allows incremental identification of new tasks based on an analysis of data acquired in previous tasks. The assessments should integrate a variety of study techniques including (1) intensive studies; (2) fixed station monitoring; (3) synoptic studies over short time intervals; and (4) extensive analysis of historical data for initial design.

ADJUSTMENTS TO WATER DATA PROGRAMS

Streamflow

COE, USGS, NWS, and BOR are the predominant Federal agencies that acquire streamflow data. A number of other agencies provide financial support.

The Corps uses surface-water data for the regulation of more than 600 multi-purpose reservoirs and other projects. There are few new construction projects in the Corps at the present time and this declining trend is expected to continue. Therefore, funds for operating and maintaining existing projects

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are reduced each fiscal year. The current (FY 1985) streamflow data program consists of approximately $11 million which is transferred to the USGS. The Corps also operates a substantial data collection program but these data are not archived or distributed for other agency use.

Funding constraints continue to reduce the size of the Corps program; continually reduced personnel ceilings also have an effect. Each year, the number of military-related functions that are contracted out increases, with the current emphasis on contracting-out civil works activities, including stream gaging. The main concern in contracting for hydrologic data collection is maintenance of quality of the product and making the data available in a consistent manner to the data users. These problems are currently receiving considerable attention.

The USGS operates the largest segment of the Nation's streamflow data program. In addition to congressional appropriations and transfers from other Federal agencies, the program is supported on a 50-50 funding basis by hundreds of State and local organizations. In FY 1985, funding for the program amounted to about $46 million with $21 million from congressional appropriations, $11 million from other Federal agencies, and $14 million from non-Federal organizations.

Inflation and budget constraints are having a serious impact on the national streamflow data program. Between 1979 and 1983, funding declined approximately 25 percent in constant 1972 dollars. The decline has leveled off since 1983 and is expected to hold fairly steady through 1987. Agencies such as BLM and BUREC, however, have indicated that their funding for streamflow data collection is expected to continue to decline. The NWS uses data collected at over 4,000 sites to support its basic flood warning and water supply forecasting services. When funding for streamflow data collection sites is reduced or eliminated, these forecasting services are impacted. Although the impacts so far have been manageable, the future appears more uncertain because most Federal agencies report continuing problems in obtaining sufficient funding for streamflow data collection.

Ground Water

The major activity that will influence ground-water data collection in the coming years is the EPA Ground Water Protection Program. For the past few years, EPA has been developing, formalizing, and planning implementation of a ground-water monitoring strategy to support their ground water protection responsibilities. A draft report, "A Ground-Water Monitoring Strategy for the U.S. Environmental Protection Agency," EPA, September 1985, sets the following objectives for a ground-water monitoring plan:

1. Characterize the Nation's ground water resources.

2. Identify new contamination problems.

3. Assess known problems to support regulatory development and standards setting to site-specific problems.

4. Assure compliance with regulations.

5. Evaluate program effectiveness.

6. Improve data quality.

7. Develop ground water data management system

Implementation of objectives 1-5 will entail both the use of existing data and the acquisition of new data and the involvement of Federal and State agencies. Federal agencies that manage Federal lands will be involved, and most of the data collection and interpretation will be the responsibility of State agencies. EPA and USGS have signed a Memorandum of Understanding (MOU) which details the activities and interactions of these agencies. The MOU is included as Appendix C of this report.

Quality of Water

During the FY 1986 budget process, a House committee report recommended that $5 million be identified "to enable the Geological Survey to develop detailed plans and take the initial steps in implementing a national water-quality assessment program. The Department of the Interior and the USGS are currently exploring potential funding and coordination considerations associated with this recommendation. Although the technical details and interagency implications are still evolving, the key features of the program are as follows:

1. The efforts will be confined primarily to those water resources which are of adequate natural quality (not saline), which have been mapped, and for which an understanding of the flow system already exists.

2. Based on hydrology, the activity will be clustered into study units which are widely scattered around the Nation, but which in aggregate account for a large percentage of the Nation's water use.

3. The program will identify a nationally consistent set of water-quality variables for study. These targets are related to one or more of the following generic water-quality issues: chemical contamination, nutrient enrichment, acidification, sedimentation, and acceptability of water for general use.

4. The program will also measure a variety of support variables which aid in interpretations of target variable data. These will include hydrological and biological measurements as well as descriptions of the area being studied (e.g., land use, geology, population).

5. The work and the reporting of results will be nested, occurring at three scales: national, study units (equivalent to river basins or aquifer systems), and intensively studied areas (a few tens of river miles for surface water and a few tens of square miles for ground water).

6. Surface water activities will be rotational. Within each study unit the data-acquisition and interpretation activities will be focused in a period

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of three years. Then, after a 6-year period of very limited activity, there will be a return to very active study for another 3 years. This 9-year cycle will continue indefinitely. Each active phase will provide a "snapshot" to compare with all the previous "snapshots." Different study units will be active at different times, keeping the national program at a constant level of effort and geographically diverse at all times. Surface water data-acquisition activities will be a mixture of fixed station, synoptic, and intensive studies.

7. Ground-water activities will focus on the 28 major regional aquifer systems which encompass over 80 percent of water use in the United States. Each of these systems is included in the ongoing USGS Regional Aquifer Systems Analysis (RASA) Program. Through this program, an understanding of the regional hydrogeology has been developed. The aquifer systems will be subdivided into study areas of manageable size, approximately 5,000 square miles. In some study areas, it may be appropriate to study aquifers which overlie or underlie the RASA aquifer, in addition to the RASA aquifer itself. The water quality of these aquifers will be studied using existing knowledge of the hydrogeology, land use, intensive studies of segments of the study area, and the statistically influenced sampling programs.

8. Special attention will be given to sampling and nationally summarizing the quality of drinking water sources.

9. Existing precipitation quality data acquisition activities and studies will be enhanced with special attention given to problems of trace metals deposited in rainfall and released from soils and rocks.

During FY 1986, the USGS and other Department of the Interior bureaus will be exploring and identifying mutual data needs and implementation procedures. State and local interests and avenues for cooperation will also be determined as the Department of the Interior develops a response to the congressional recommendations.

PROGRAMS AND BUDGET OUTLOOK

Estimated FY 1987 budget requests for water data acquistion are reported by agency in Figure 1. Funding is reported for data collection and exchange programs funded by the Federal Government. The programs include continuation of existing and planned data collection, transmission, initial processing, and dissemination. The data are collected for streams, lakes, reservoirs, estuaries, and ground water, and describe quantity and quality characteristics of water. Included are the laboratory activities associated with analyzing samples for chemical, physical, and biological characteristics.

Estimates reported in Figure 1 represent anticipated budget requests by each agency; transfers of funds are not included. Actual funds expended by each agency may be different because final agency budgets will not be set for perhaps another 10 to 12 months. Past experience indicates that although individual agency budgets may change, the totals have not changed significantly.

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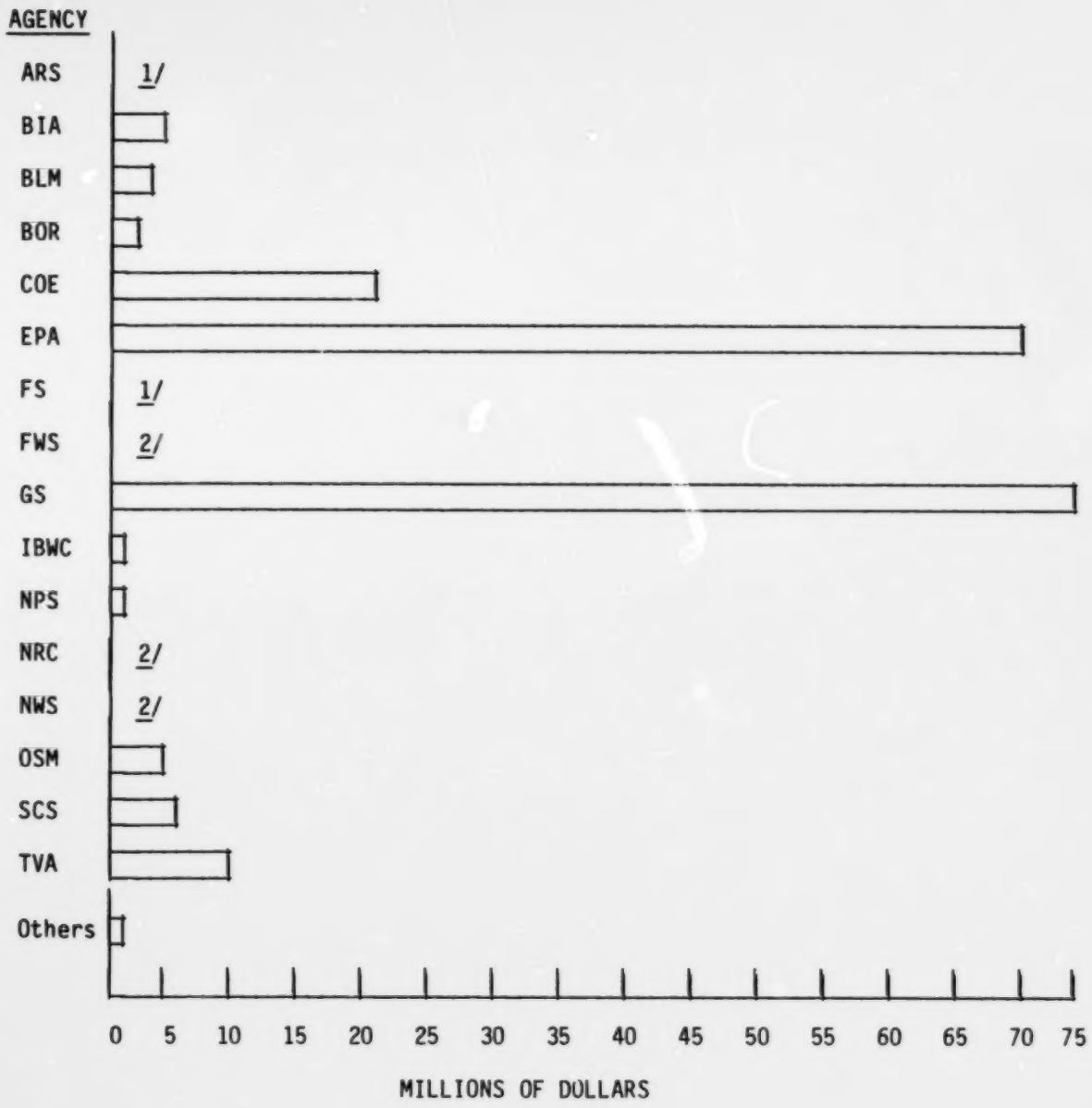
Figure 1--Estimated Federal Agency Water-Data Budget Requests, Fiscal Year 1987



1/ Less than 1

2/ Not reported

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Appendix B summarizes the Federal agency missions and contains brief program statements describing their water data acquisition programs. Included are current activities and needs in 1987 and beyond. Continuing the trend of recent years, the key agency concerns are ground-water quality, toxic pollutants, toxic-waste management, and nonpoint source pollution. Several agencies are also giving special attention to finding ways to contain the cost of operating streamflow measuring sites, especially those required for operational purposes.

CONCLUSIONS

Water quality, especially the quality of ground water, continues to receive major emphasis by numerous agencies. Most of the major water agencies report programs dealing with nonpoint source pollution, hazardous waste management, salinity and irrigated agriculture, erosion and sedimentation, and a myriad of issues relating to protecting the Nation's water quality and providing the information required for effective decisionmaking.

The interagency coordination process continues to work effectively with good participation from the appropriate agencies. Interagency agreements to identify agency responsibilities and utilize specialized resources appear to be effective mechanisms; the mutual benefits of interagency cooperation provide the basis for successful coordination under the voluntary participation mode utilized in the A-67 mandate.

Total water data budget requests reported by Federal agencies for FY 1987 are slightly more than $200 million. This total appears to indicate a significant increase over FY 1986. Actually there is little real difference from FY 1986; the apparent increase results from a more intensive analysis of EPA's water monitoring related activities including research, development, and ground-water efforts. (The same procedure will be utilized for reporting purposes in future federal plan submissions.) It is important to note that budget figures reported are agency requests developed early in the budget process and actual appropriations may be different. The trend of decreasing Federal outlays for water data acquisition evident in the early 80's appears to have stabilized after small increases in fiscal years 1984 and 1985. The escalating cost of data collection is a major concern. Finding ways to reduce this cost continues to receive major attention by all agencies.

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APPENDIX A

OFFICE OF MANAGEMENT AND BUDGET
CIRCULAR A-67

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APPENDIX A

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

August 28, 1964 CIRCULAR NO. A-67

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Coordination of Federal activities in the acquisition of certain water data

1. Purpose and coverage. This Circular prescribes guidelines for coordination of Federal activities in acquiring water data from streams, lakes, reservoirs, estuaries and ground waters. Included in such activities are the obtaining of quantitative and qualitative data, their processing, publication, and storage. Excluded are activities concerned with research plots and experimental watersheds, and data on precipitation, evaporation, snow accumulation, and soil moisture.

The Geological Survey of the Department of the Interior acquires basic water data on the water resources of the Nation. A number of other agencies acquire special water data in support of their respective missions. The basic and the specialized activities need to be closely and continually coordinated to assure effective and economical management of resources in meeting essential user requirements.

The guidelines outlined in this Circular contemplate that (a) the Department of the Interior will operate a national network for acquiring water data; (b) the user agencies will arrange for the acquisition of specialized water data that cannot be provided efficiently, and in a timely manner, through the national network; (c) certain procedures will be followed to facilitate close interagency consultation in the acquisition of water data; and (d) the Department of the Interior will conduct a continuing and systematic review directed toward efficient coordination of Federal water data acquisition activities.

Agencies needing particular water data in support of their missions will, to the extent practicable, be responsible for funding for the attendant data acquisition activities. The Bureau of the Budget will assist agencies in effecting adjustments in funding arrangements required to conform with the division of responsibilities set forth in this Circular.

2. Responsibility for water-data acquisition.

a. The Department of the Interior is responsible for the design and operation of the national network for acquiring data on the quantity and quality of surface and ground waters, including sediment load of streams. Except as set forth in paragraph 2b below the network will meet the water quantity measurement requirements of all Federal agencies and will provide water quality measurements common to the needs of two or more agencies.

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b. Departments and agencies whose operating requirements cannot be met efficiently through the national network, including appropriate adjustments therein, will arrange for specialized data acquisition. Determination as to the need for specialized data is entirely the responsibility of the user agencies.

Such data are normally obtained in circumstances characterized by:

(1) short observation periods, e.g., measurements of streams during low flow to determine their capacity for receiving waste;

(2) unstable quantity and quality parameters, e.g., measurements of the drastic changes in dissolved oxygen content resulting from industrial pollution;

(3) need for costly and rarely used instrumentation, e.g., gas chromatographic equipment to measure minute concentrations of organic chemicals resulting from pesticide residues;

(4) concentration of measurements within a limited reach or area, e.g., measuring surface profiles of water for the design of levees in flood control programs;

(5) need for special skills not available in the agency operating the national network, e.g., detecting the presence of viruses and related living and physical properties;

(6) need for immediate reporting of data, from either a national network or special station, e.g., reports required for river forecasting.

c. In operating the national network the Department of the Interior will utilize the services of other agencies in acquiring national network water data when such cooperative arrangements are more effective or economical than having the Department acquire such data. Conversely, agencies needing water data to meet their special operating requirements should first determine the availability of the services of the Department of the Interior. Only if such a cooperative arrangement or use of other agencies' facilities is found by the user agency, after consultation with potential cooperating agencies, to be less efficient or clearly impracticable, will the agency undertake data acquisition activities. Each agency will coordinate its activities with those of a similar nature being conducted under state and local auspices.

d. The Department of the Interior will maintain a central catalog of information on national network and specialized water data and on Federal activities being planned or conducted to acquire such data. That Department, with the assistance of user agencies, should organize the national network data and catalog of information on specialized data in such form as to facilitate maximum use by agencies and other interested parties of the cataloging facilities. In addition, user agencies will maintain on file such water data as are necessary in the efficient conduct of their respective operational missions, and to respond to requests for specialized data and their evaluation and interpretation.

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3. Procedures for coordination.

a. The Department of the Interior is responsible for exercising leadership in achieving effective coordination of national network and specialized water data acquisition activities. The Department, with the participation of other agencies concerned, will undertake review of water data requirements and activities with the objectives of (1) identifying common needs for water data and establishing, and revising as appropriate, national network data acquisition activities, (2) advising user agencies promptly of the extent to which the national network can meet their special requirements for water data, and (3) achieving optimal coordination of network and specialized data activities in order to meet, effectively and economically, the variety of needs for water data. With the advice and assistance of other agencies concerned, the Department will establish procedures designed to carry out its responsibilities under this Circular.

b. In consonance with procedural objectives in paragraph 3a above the Department of the Interior will prepare and keep current a Federal plan, and the status of its implementation, for the efficient utilization of network and related specialized water data acquisition activities. Planning should be directed towards the establishment of both long-range and intermediate agency objectives and the development of water data acquisition activities related to both sets of objectives. The plan should clearly identify planning assumptions, any unresolved interagency issues, and the views of the agencies concerned. The Department of the Interior should assure that the plan, relating proposed activities to fiscal year and longer range objectives, is available for review of the various agencies' budgets for fiscal year 1966 and for annual previews of the budgets thereafter.

In preparing and revising the plan, the Department of the Interior will obtain the advice and assistance of the principal agencies providing or utilizing water data. The Department should exercise leadership in assuring that differences of opinion are resolved expeditiously.

c. Any major differences among agencies with respect to matters within the purview of this Circular, that cannot be resolved through consultation, may be referred by the head of any agency concerned to the Director of the Bureau of the Budget.

ELMER B. STAATS
Acting Director

APPENDIX B

AGENCY MISSIONS AND PROGRAM STATEMENTS

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DEPARTMENT OF AGRICULTURE

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AGRICULTURAL RESEARCH SERVICE (ARS)

Agency Data Needs--Base Program and Changes (1985-1987). The mission of the ARS is to plan, develop, and implement research that is designed to produce the new knowledge and technologies required to assure the continuing vitality of the Nation's food and agricultural enterprise. As a Federal research agency, ARS addresses problems that are of legitimate national concern, conducts research that is appropriate for the Federal Government, and utilizes the unique capabilities of ARS scientists and the facilities they operate.

The ARS has identified six categories of research with specific objectives for each. The need for water data is associated primarily with the research category concerned with the development of improved water management systems and practices to achieve effective and efficient use of water resources. Related research programs require onsite monitoring of climatic and environmental factors together with ground water and streamflow data (quality and quantity) as needed for specific studies. Improved technologies are needed for assessing changes in the quantity and quality of water resources. As the competition for water grows, accurate and timely information about changes will be vital for making the best use of resources, which generally is the most limiting factor in agriculture.

The number of ARS studies requiring water data varies from year to year depending on the scope and duration of the separate investigations. As of January 1, 1985, about 160 individual study areas, ranging in size from less than 0.5 acre (0.2 hectare) to over 207 square miles (536 square kilometers) were collectively in operation at major watershed research study headquarters at University Park, Pennsylvania; Coshocton, Ohio; Athens, Georgia; Oxford, Mississippi; Columbia, Missouri; Temple, Texas; Durant, Oklahoma; Tucson, Arizona; and Boise, Idaho. Continuous streamflow measurements, supported by about 360 continuously recording precipitation stations, are obtained on all research watersheds. Water data in the form of plot runoff, soil moisture, evaporation, and other parameters are obtained at about 55 other locations in the 50 States and Puerto Rico.

Water data collected at the major research centers are reviewed and sent to the Water Data Center in Beltsville, Maryland, for inclusion in the ARS Water Data Bank (a computerized data base currently containing approximately 12,000 station years of precipitation and runoff in continuous record format). The data are then available to all requesters in computer form or as summarized annual reports.

Because of an increased emphasis on integrative systems research in solving broad regional and national agricultural problems, the ARS has increased its involvement in interagency relationships to obtain the wide spectrum of climatic variables needed to develop complex management systems. Interaction with the Soil Conservation Service (SCS) includes use of SNOTEL (snow and related hydrometeorological data) in the development of snowmelt-runoff models and research into the underlying relationships of soil temperature, soil moisture, and runoff. Ongoing efforts also include the development of hydrologic models for use by the SCS. ARS is an active member of the National Water Data

Exchange (NAWDEX); about 300 ARS watershed studies are currently indexed in NAWDEX. Other computer models have been cooperatively developed by ARS and USGS which will use common data collected by either agency. Remote sensing data are becoming increasingly important in the development of water-related models by ARS scientists. ARS has an active and effective cooperative program with the National Aeronautics and Space Administration for the development and understanding of strategies for collecting, understanding, and using remotely sensed data in relation to agricultural management. ARS also has an ongoing need for data from other agencies such as the National Weather Service, the Forest Service, and Environmental Protection Agency. ARS has access to the WATSTORE and STORET data bases through its membership in NAWDEX.

Future Data Needs and Plans (1988 and Beyond). Long-term program plans for ARS are to develop technology for assessing and predicting long-term changes in the quantity and quality of soil, water, and air resources available to agriculture, develop improved water management systems and practices to achieve effective and efficient use of water resources, and to develop subsystems and models that integrate the use of soil, water, and air resources for optimum management of major land resource areas. Current levels of data collection are expected to be maintained without major change. ARS is currently anticipating an increased need for ground-water data with specific information concerned with the movement and effects of soluble solids, toxic elements (such as selenium), nitrogen, and pesticides.

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ECONOMIC RESEARCH SERVICE (ERS)

Agency Data Needs--Base Program and Changes (1985-1987). Agency objectives in water resource economics are to determine changes in water supply and use in agriculture and analyze the impact of these changes on the irrigated sector of agriculture and agricultural production. Water-related data responsibilities are to maintain a broad base of economic and water resource information on the irrigated sector of agriculture, a large part of which is obtained by accessing data bases of other agencies.

Future Data Needs and Plans (1988 and Beyond). Continuation of the Farm and Ranch Irrigation Survey, Census of Agriculture data on irrigation, and improved estimates of water use in agriculture.

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FOREST SERVICE (FS)

Agency Data Needs--Base Program and Changes (1985-1987). For the National Forests and Forest Service Research projects, data are needed to inventory existing water quantity and quality and develop techniques to predict the effects of management on water resources. For State and Private Forestry, data needs are determined by the organizations with which the FS cooperates.

To increase cost effectiveness and data continuity, the National Forests projects use existing data collected by Forest Service Research and other agencies rather than initiating major internal data collection efforts. Such internal efforts are normally confined to specific projects or special management situations (for example, Research Natural Areas).

Memorandums of Agreement exist between the FS and the U.S. Geological Survey (USGS) for access and use of computer-based water data and for the USGS to collect and reduce water quantity and quality data for the FS. These cooperative projects are associated with both short-term and long-term data needs. With the exception of intermittent measurements and sampling of surface-water and water quality parameters, which are normally handled in-house, most data gathering is handled via agreements with appropriate Federal and State agencies.

Future Data Needs and Plans (1987 and Beyond). Data acquisition will continue to focus on water research, specific projects, and special situations. Budget projections forecast declining data collection efforts. These reductions will affect water inventories and monitoring, plus data needed for watershed improvements and water rights. Emphasis will continue to shift away from collection of site-specific water data toward more cost-effective measurement of biological and other surrogate indicators. Continued emphasis will be placed on other Federal and State agencies to provide water data. Water quality data needs are increasing significantly with increased involvement in the rural Clean Water Program (P.L. 95-217--Clean Water Act of 1977) and evaluation of Best Management Practices (BMP) and their effects upon water yield and water quality.

Implementation of forest plans under the National Forest Management Act will require water quality and flow data to evaluate future plan modifications and natural resource allocations and environmental responses.

Forest Service Research will focus on analyzing existing long-term data, adding to the data base for specific research purposes, such as acid precipitation, and conducting intensive short-term experiments to evaluate hydrologic processes and develop predictive models showing management effects. The National Forests will focus on developing and using predictive models to show integrated water resource effects and on monitoring surrogate indicators of water conditions. The National Forests projects will collect a minimum of water data. Efforts to develop new instrument technologies to collect more intensive, meaningful data at lower cost will accelerate.

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Increased reliance on and cooperation with other agencies will be needed for collection of acid precipitation, baseline small watersheds, flood forecasting, and surface-water quality data.

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SOIL CONSERVATION SERVICE (SCS)

Agency Data Needs--Base Program and Changes (1985-1987). To accomplish its mission, the SCS, in cooperation with State and local governments and other Federal agencies, carries out programs of basic soil and water conservation, watershed protection, flood prevention, cooperative river-basin surveys and investigations, Great Plains conservation, water quality, and resource conservation and development. Each of these programs requires water and related data for planning, design, and construction. The majority of SCS programs are carried out in rural areas in small drainage basins where little or no water data are available. Despite significant increases in available data from these kinds of areas over the past few years, a large unsatisfied need still exists. Information required from these data-deficient areas is usually obtained from a rainfall-runoff model or from a regional study of available data. Other water data needs are met by a variety of techniques including in-house data collection activities, Federal-State cooperative programs, and cooperative arrangements with other Federal agencies.

SCS has installed 490 automated data sites in the Western mountains where snow and related hydrometeorological data are collected primarily for developing water supply forecasts. Snow-water equivalent and depth are collected by manual techniques at an additional 1,100 locations. Thirty-seven new automated data sites are being installed in the Colorado River Basin as part of a cooperative effort with the National Weather Service to improve streamflow forecasting in the Colorado River Basin.

Water supply forecasting is highly dependent on streamflow data which is funded and collected by the U.S. Geological Survey (USGS) and a number of other Federal, State, and local agencies. Precipitation and temperature data collected by other agencies are also used in this program. Many of the data sites are located on public lands administered by the U.S. Forest Service and Park Service. Both formal and informal agreements are in effect with a host of Federal and State agencies involved in data collection and exchange.

Measurements of surface-water flow, inflow, outflow, or both, are being made at several hundred proposed or constructed impoundments for planning, evaluation, and reservoir operation.

Water quality measurements are being made on a systematic basis in five experimental Rural Clean Water Program (RCWP) Projects in Idaho, Vermont, Illinois, Pennsylvania, and South Dakota. The latter two projects were begun in Fiscal Year (FY) 1983 and emphasize primarily the effects of conservation practices on ground-water pollution from nitrates. Comprehensive monitoring is also being done on a P.L. 566 land-treatment watershed in Vermont. All of these projects are scheduled for a 10-year period. At an additional 16 RCWP projects, water quality data are collected utilizing State agency facilities and staff. The goals of these projects are to evaluate the effect of implementing conservation practices on surface- and ground-water quality.

SCS will be working closely with the Environmental Protection Agency (EPA) and other Federal agencies to inventory and document potential nonpoint pollution

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sources to ground-water aquifers. Special studies of the potential impact of conservation tillage and its associated herbicide/pesticide use are being conducted, and an effort will be made to involve other Federal agencies, as appropriate.

As a part of the Colorado River Salinity Control Plan (CRSCP), SCS has initiated a comprehensive 10-year monitoring and evaluation plan for the Grand Valley, Colorado, and Uinta Basin, Utah, salinity-control projects. The SCS effort will focus on monitoring on-farm irrigation water management practices, efficiencies, and impacts on approximately 30 farms each year in each project. Off-farm monitoring of streams and the Colorado River will be continued through the 20-station network administered by the USGS and the Bureau of Reclamation. Continuing the basinwide monitoring network is important to complement the on-farm and site-specific information collected by SCS and to determine potential basinwide effects.

In addition, more than 100 project areas are under study to determine effects of conservation practices on water quality. This involves approximately 500 locations where water quality and quantity are measured. These are short-term records of 3 to 5 years' duration.

Due to a slowdown in both watershed planning and construction programs, fewer surface-water inflow measurements will be made on proposed or constructed impoundments.

Pending funding for expanded implementation initiatives, it is anticipated that several (two to three) salinity projects will be initiated in FY 1987. These new projects will have monitoring programs similar to the Grand Valley and Uinta Basin projects. On-farm and off-farm monitoring will be complementary components necessary for measuring salt load reduction impacts on the Colorado River.

The reauthorization of the Clean Water Act, P.L. 92-500, may provide additional emphasis for a coordinated interagency effort to address nonpoint source pollution problems.

Future Data Needs and Plans (1988 and Beyond). Plans are to phase out unnecessary manual snow and related hydrometeorological measurements, particularly those measured directly by SCS, and to rely more heavily on automated sites for forecast purposes.

Streamflow measurement for water resource planning and for reservoir operation will continue on an as-needed basis.

Monitoring for the five RCWP projects will continue until at least 1990.

On-farm implementation programs in connection with the CRSCP are scheduled to continue until the year 2000. Approximately five additional projects will be implemented during this period with continued on-farm and basinwide monitoring to measure program effects.

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In addition, a special nonpoint source evaluation study is being planned in the Chesapeake Bay Watershed. This study anticipates full involvement of Federal, State, and local agencies in accordance with agreements with EPA's Chesapeake Bay Program Office. The first phase will be data collection and preimplementation plan development with implementation occurring in selected subwatersheds in future years.

There is significant concern for maintaining and improving ground-water quality, but the SCS role is not well defined at this time.

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DEPARTMENT OF COMMERCE

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BUREAU OF THE CENSUS (CEN)

Agency Data Needs--Base Program and Changes (1985-1987). In cooperation with business and industry, Government, and other public or private organizations, the mission of CEN is to conduct censuses and surveys and otherwise collect, process, and analyze statistical data relating to the social and economic activities and characteristics of the population and enterprises of the United States or other areas prescribed by law; and to publish and disseminate the resulting statistics for use by business, Government agencies, and the public.

CEN also conducts special statistical studies on domestic and foreign trade, business services, industry, transportation, construction, agriculture, population, housing, and Federal, State, and local governments. Based on these statistical studies, the Bureau issues reports, special tabulations, and monographs.

CEN must provide data to Government agencies and to the private sector on the intake, use, and discharge of water by major users in the manufacturing and mineral industries sectors of the economy. Water-use data are collected as a supplemental survey for the year following the quinquennial economic censuses. The economic censuses are taken for the years ending in 2 and 7; the water-use survey is taken for the years ending in 3 and 8. This survey includes establishments in the manufacturing and mineral industries that responded during the economic censuses that they consumed 20 million gallons of water or more during the calendar year. This panel of respondents is then mailed a questionnaire requesting detailed information on their sources of water, purpose of intake, discharge, treatment prior to discharge, recirculation efforts, and capital and operating expenditures related to these operations. Information is published by industry Standard Industrial Classification (SIC), as well as by State and U.S. Geological Survey water resources regions. The most recent survey was taken in 1984 for the survey year 1983. Processing of the data will be completed in the fall of 1985 with the reports for both mineral and manufacturing industries published before the end of the year.

As part of the census of agriculture, general information on irrigation is collected along with other required farm and ranch data. This includes information on total number of farms with irrigation, land area (harvested crop land and pasture) irrigated, and principal source of irrigation water. This information is available by State and county. Beginning in 1982, this census will be taken quinquennially at the same time as the economic censuses, for the years ending in 2 and 7.

In addition, CEN is also required to conduct a census of irrigation organizations (referred to as the census of irrigation) every 10 years; the last census was for 1978. In this census, data are collected on source and disposition of water, number and type of users served, the number of acres served, irrigation facilities operated, irrigation storage reservoirs, measurement of irrigation water, cost of operation and maintenance, new capital investment, indebtedness, and revenues collected. These data are presented by State, water-resource regions, and subregions.

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A detailed farm and ranch irrigation survey was initiated for 1979. This survey, a 10-percent sample of all farms and ranches reporting some irrigation activity during 1978, was to supplement the basic irrigation information collected for the census year. Data collected included acres irrigated, yields of irrigated and nonirrigated crops, quantity of water used, method of water distribution, types of pumps, inventory and characteristics of irrigation wells, expenditures for pumping irrigation water, and expenditures for water obtained from off-farm suppliers.

In cooperation with the U.S. Department of Agriculture, Economic Research Service (ERS), a survey of farms utilizing irrigation in the 1982 Census of Agriculture was conducted for calendar year 1984. The program included the basic data collected in the 1979 irrigation survey plus estimates of the quality of water applied to specific crops or crop groups. Final publication is expected to be available in the spring of 1986.

CEN also conducts an annual survey of capital expenditures and the operating costs by manufacturing for pollution abatement (air, water, and solid waste). The water-related information collected includes capital expenditures (end-of-line techniques and changes-in-production process), operating costs, water pollutants abated by weight, costs recovered through abatement activities, and payments to Government units for use of public sewage. Data are by industry (four-digit SIC) and by State (two-digit SIC). Processing of 1984 survey data is in progress. The final report is scheduled to be published and released in January 1986.

Future Data Needs and Plans (1988 and Beyond).

1. The next survey of water use in manufacturing and mineral industries will take place in 1989 for survey year 1988. Very little program work will be done during fiscal years 1986 and 1987. However, in fiscal year 1988 program planning and development will begin and data content of the questionnaire will be reviewed with user groups and finalized.

2. Activities related to irrigation data collection during fiscal years 1986 and 1987 will concentrate on program planning and development of the 1987 Census of Irrigation and the proposed 1988 Farm and Ranch Irrigation Survey. Activities will include conducting user advisory meetings, identifying content for the census and survey, and reviewing options for the 1987 Census of Irrigation, scope and coverage.

NATIONAL OCEAN SERVICE (NOS)

Agency Data Needs--Base Program and Changes (1985-1987). NOS is responsible for operating a network of water-level stations in the Great Lakes to provide data for national and international use by Federal and local governments, various international treaty boards and committees, private interest groups, and the general public. Under this mission responsibility, NOS collects or participates in the collection of hydrometeorological data elements such as lake levels, water-surface profiles of major connecting Great Lakes Channels, Great Lakes Basin precipitation, wind speed and direction, water temperature, barometric pressure, ice conditions, and stage-discharge relationships for canals and hydroelectric power generation. The methods required to accomplish these needs are both automatic and observer-oriented. At present, 40 percent of the permanent lake-level data is automated for real-time operation. The remainder of the collection network depends on contracted observers, who are still a key part of maintaining a 90-percent data collection success rate.

The mainstay of the NOS Water Level Program is the operation of the base program consisting of 54 permanent and 123 seasonal gaging sites, located throughout the 295,000 square miles of the five major lakes, their connecting channels, and the St. Lawrence River, which are referenced to the International Great Lakes Datum (IGLD). This datum, and its maintenance and updating, are also part of the base program. Currently, there are over 3,000 marks referenced to IGLD in the Great Lakes Basin and the information is available in the data base file.

Because precipitation is the original source of all water in the Great Lakes, it is of vital concern in the monitoring and regulation of the system. Monthly data from 800 United States and Canadian stations are obtained, processed by computer, and forwarded to the Corps of Engineers for use in forecast and regulation applications.

Changes in Automatic Data Collection System equipment and upgrades in the computer processing system are now becoming a reality. These changes will result in improved quality-control monitoring and procedures, and improve the data base availability to all water resources managers and the general public.

Field work for IGLD vertical maintenance has been completed. Publication and implementation of elevations are expected in 1986 provided the current funding is maintained.

Future Data Needs and Plans (1988 and Beyond). Basic future data needs are expected to be similar to current needs. The proposed new data collection system, with installation of initial field units in Fiscal Year 1986, will consist of primary features such as noncontract sensors, computer-controlled data collection via data collection platforms, data transmission via Geostationary Operational Environmental Satellites, optional telephone/short-range radio links in real time, and an integrated data processing and analysis system based on modern automated data processing hardware and software. The new systems are expected to provide results in facilitating field operations and maintenance, improve data quality and timeliness, and

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greatly reduce the current labor-intensive data handling. These planned systems are directed toward both the water-level data collection and the IGLD reference system for as many "push button" operational concepts as state-of-the-art science can achieve.

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NATIONAL WEATHER SERVICE (NWS)

Agency Data Needs--Base Program and Changes (1985-1987). NWS needs hydrometeorological and surface-water data for real-time operations and nonreal-time data base purposes. The elements of primary need from designated networks are soil moisture, precipitation, river stage, snowfall, water equivalent of snow and ice on the ground, lake levels, streamflow, reservoir elevation and discharges, air temperature, wind velocity, evaporation, solar radiation, and surface-water temperature. Most of the hydrometeorological data are obtained from continuously operating in-house data collection programs, while the majority of the required surface-water data is obtained from the data collection programs of other agencies.

The NWS collects river-stage data from all sources for some 1,800 stations, and precipitation data from about 4,100 stations. An additional 1,100 stations report both river and precipitation information. The data from these 7,000 stations are used to provide river and flood forecast services to over 3,000 communities nationwide. About 20 percent of the 7,000 stations are automated. Automation includes using telephone, VHF radio, and the Geostationary Operational Environmental Satellite (GOES) to meet operational data requirements for flood forecasting. The automated stream-gaging stations are generally those of a cooperating agency needed to support its own data collection requirements. An additional 2,100 reports are collected from other agency automated data networks, mostly data acquired via the GOES satellite.

All NWS offices have AFOS (Automation of Field Operations and Service), a high-speed computer network connecting all NWS offices nationwide for storage, delivery, retrieval, and display of data, forecasts, and warnings. All NWS River Forecast Centers have "gateway" computers to complement their AFOS equipment. These computers and their associated software are being interfaced with those of other water resources agencies for data and information exchange. They also have the capability to collect data operationally from local and site-specific warning networks.

Future Data Needs and Plans (1988 and Beyond). NWS objectives for improved service include: (1) satisfying a wide variety of real-time water-use situations across the country, (2) satisfying applications for near, mid-, and long-term forecast time scales; (3) providing up-to-date information on a frequency appropriate to the service application; and (4) considering adaptability to weather and climate changes year-round. To provide these improved services, the NWS plans to automate 1,000 additional hydrometeorological stations. These will complement approximately 1,000 stations (Automation of Surface Observations Program) that will be installed primarily at airports by the NWS, Federal Aviation Administration,and Department of Defense, plus an anticipated 1,000 hydrometeorological stations whose data will be made available to the NWS by other Federal, State, and local community systems. These 3,000 stations will be used in conjunction with 113 doppler radar stations to provide national precipitation coverage.

Budgetary constraints facing the agency could impact the operation and management of the real-time networks that support the river and flood forecasting service.

DEPARTMENT OF DEFENSE

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U.S. ARMY CORPS OF ENGINEERS (COE)

Agency Data Needs--Base Program and Changes (1985-1987). The Corps requires water data to accomplish its mission of effectively planning, designing, constructing, and operating water resource projects. Besides a large in-house data collection effort, the Corps also obtains water data from other Federal, State, and local sources. Water data are obtained through contracts with Federal agencies by interagency transfer of funds. The Geological Survey has been the major participant. In order to meet real-time operational and reliability needs for its many water-control projects, the Corps has been converting many stations from the standard method of data transmission to satellite transmission using data collection platforms (DCPs). For example, at the end of FY 1977 the Corps had only 58 self-timed DCPs, and 10 years later approximately 2,300 self-timed DCSs will be in operation. The Corps is the established leader in the use of satellite telemetry for data collection. Presently, the Corps owns 53 percent of all DCPs operated by all Federal agencies.

There are no known major new legislation or court decisions affecting the Corps' planned data program for 1987 and beyond. However, tight budget constraints are bringing closer scrutiny to the water-control management and data collection programs. In recent years, the total number of stream gages supported by COE has been gradually declining. Plans indicate additional reductions in the number of gages, type of service, and frequency of gage maintenance visits. The Corps is examining this program and is attempting to reduce costs in FY 1986 with additional significant cost savings in 1987. The Corps is exploring the possible use of private contractors.

Future Data Needs and Plans (1988 and Beyond). The Corps plans to continue reviewing its needs to assure that services are restricted to those that are absolutely required. In the future, it is inevitable that State and local interests will have to pay a larger share of the cost of stream-gaging activities. Cost savings will be an actual theme in the planning process.

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DEPARTMENT OF ENERGY

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FEDERAL ENERGY REGULATORY COMMISSION (FERC)

Agency Data Needs--Base Program and Changes (1985-1987). Under the Department of Energy Organization Act, FERC was created (effective October 1, 1977) as an independent agency within the Department of Energy. FERC assumed most of the functions of the former Federal Power Commission, which was abolished by the act.

The mission of FERC relating to water resources is in licensing the development of hydroelectric power that is economically, socially, technically, and environmentally acceptable; to help ensure the comprehensive development of the Nation's water and related land resources through the agency's hydroelectric licensing program; and to support and participate in comprehensive interagency, governmental, and private planning efforts.

Principal among the Commission's responsibilities relating to water resources development are licensing non-Federal hydroelectric projects and conducting river basin planning studies, either in connection with licensing or in cooperation with other Federal agencies with respect to Federal river basin management programs. Important related activities include the inspection of licensed hydroelectric projects to ensure dam safety and proper operation and maintenance of projects, maintenance of an inventory of hydropower resources of the country, investigation of headwater benefits, and withdrawal from entry or sale of certain Federal lands having value as existing or potential hydropower sites.

To carry out its licensing responsibilities, FERC utilizes water data collected by the U.S. Geological Survey (USGS); other Federal, State, and local agencies; and its licensees. A standard condition in all hydroelectric licenses issued for major projects requires the licensee to install and maintain necessary streamgaging facilities under the supervision of the USGS. Also needed are data on oxygen and chemical content, sanitary conditions, and water temperatures. Funds for such supervision and cooperation by the USGS are advanced by the licensee. Additional data needed for FERC studies include data on the operation of existing reservoirs, historical streamflow data to evaluate potential hydropower sites and calculate benefits at operating powerplants, and evaporation and sedimentation rates.

Future Data Needs and Plans (1988 and Beyond). The unusually large number of applications for permits and licenses to construct hydroelectric projects is expected to continue for several more years. The majority of the projects would be relatively small in scale or would be installed at existing dams. Many of these licenses will involve establishing minimum streamflows and implementing related monitoring programs to ensure compliance with the specific license requirements. In general, the FERC's water data needs in 1987 and 1988 will continue to increase somewhat to accommodate the expanding small hydroelectric program.

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DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

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OFFICE OF HOUSING

Agency Data Needs--Base Program and Changes (1985-1987). The Office of Housing has departmental programs and functions for financing and managing housing, and preserving and rehabilitating the housing stock.

The Housing Program water-related data needs include identification and quantification of surface- and ground-water quantity and quality and water-related problems such as potential flood levels; land movements due to erosion, slides, and subsidence; and pollution. Data are normally obtained from a variety of sources including the Environmental Protection Agency (EPA), Geological Survey, Soil Conservation Service, State and local health departments, State agencies, local governments, and site-specific engineering studies.

Future Data Needs and Plans (1987 and Beyond). For developing areas of the Nation, the Office of Housing will need information to assure that dwelling occupants will have an acceptable and safe water supply for all household uses, and that occupants and dwellings will be reasonably protected against hazards.

Ground-water quantity and quality data are needed. Water quality should be reported at least in terms of EPA drinking-water standards.

Flooding hazards and exposure frequency are needed for all urban and suburban waterways not currently addressed by the National Flood Insurance Program.

Potential land movements caused by erosion, slides, and subsidence need to be identified and quantified. Locational risk factors are needed.

Surface-water and ground-water pollution problems caused by liquid and/or solid-waste disposal must be evaluated, particularly for hazardous-waste disposal sites identified by EPA.

OFFICE OF COMMUNITY PLANNING AND DEVELOPMENT

Urban Development Action Grants (UDAG)

Agency Data Needs--Base Program and Changes (1985-1987). The UDAG program provides discretionary grants to cities that meet certain statistical distress criteria, demonstrate results in providing equal opportunity in employment and housing, and meet competitive selection criteria including job formation and private investment. Action grants may be used for a wide range of activities, including 100 percent of the cost of the acquisition, construction, reconstruction or installation of water facilities including source development, impoundment, treatment, transmission, storage, and distribution.

The program need for water data is a responsibility of the grant recipient, and data are normally obtained from other Federal agencies (the Corps of Engineers, Geological Survey, Soil Conservation Service, Bureau of Reclamation, and other agencies), State agencies, and private consultants.

Future Data Needs and Plans (1988 and Beyond). No significant changes or new thrusts are apparent at this time.

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COMMUNITY DEVELOPMENT BLOCK GRANTS (CDBG)

Agency Data Needs--Base Program and Changes (1985-1987). Under the Block Grant Program, cities may undertake a wide range of activities directed toward neighborhood revitalization, economic development, and improved community facilities and services. The Block Grant Program provides grants to local governments for activities such as the acquisition, construction, reconstruction, or installation of public facilities, and improvements such as water facilities, which may include source development, impoundment, treatment, transmission, storage, and distribution. Localities entitled to annual grants include central cities of Standard Metropolitan Statistical Areas (SMSAs), other cities in SMSAs with populations of 50,000 or more, and counties in SMSAs with populations of 200,000, excluding entitled cities. Grant amounts are determined by a statutory dual formula, which includes either population, poverty, and overcrowded housing or population growth, lag, and age of housing. Nonentitled localities compete for funds allocated by State under a similar formula. The competitive grants are allocated and administered either by a State or by the Department of Housing and Urban Development, at the option of each State. All activities must meet the national objectives for program benefit. Under the CDBG Program, responsibility for compliance with the National Environmental Policy Act is delegated to the grant recipient.

The program need for water data is a responsibility of the grant recipient, and data are normally obtained from other Federal agencies (the Corps of Engineers, Geological Survey, Soil Conservation Service, Bureau of Reclamation, and other agencies), State agencies, and private consultants.

Future Data Needs and Plans (1988 and Beyond). No significant changes or new thrusts are apparent at this time.

DEPARTMENT OF THE INTERIOR

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BUREAU OF INDIAN AFFAIRS (BIA)

Agency Data Needs--Base Program and Changes (1985-1987). BIA needs water data to develop the water resources on approximately 52 million acres of Indian Lands and 500,000 acres of federally owned lands for such purposes as irrigation, range, hydropower, municipal and industrial use, flood control, fish and wildlife enhancement, and recreational water needs, while preserving the physical, chemical, and biological content of these resources. In addition, the Bureau uses its technical expertise to assist Indian tribes in establishing and protecting rights to sufficient quantities of water to maintain an acceptable standard of living in support of the concept of the need for permanent tribal homelands.

The Bureau needs a variety of water data to accomplish its multifaceted mission. Examples include: (1) ground-water quantity data to be used in the control of ground-water withdrawals to support water rights litigation, and to prevent water mining (permanent aquifer damage), land subsidence, and the intrusion of salt water or other polluted or degraded waters; (2) ground- and surface-water data needed to assist agricultural engineers in the identification of sources of pollution and to prevent gradual degradation of quality; (3) surface-water quantity data to assist in flood plain mapping and development of zoning ordinances, to determine allocations to irrigation subsystems, to assure adequate design of hydraulic structures (such as bridges, culverts, and dams), and to support water rights litigation. Some of this data is gathered in-house as needs are identified at specific sites. The data resources of other Federal and State activities, most frequently the U.S. Geological Survey, are also used, as are those of private contractors.

The number of Bureau activities that support upcoming water rights litigation varies from year to year. The Bureau is currently pursuing a program of water resources inventories in order to provide for the orderly development and optimum use of these valuable resources with minimum impact on the environment.

Future Data Needs and Plans (1988 and Beyond). The major plans for the next 2 years will include continued emphasis on Indian water rights and development. Implementation of the ongoing water policy implementation plan provides for negotiation or litigation to resolve Indian water rights, as well as for development. Concurrently, there is an increased emphasis on water data communication and coordination with other Federal and State activities.

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BUREAU OF LAND MANAGEMENT (BLM)

Agency Data Needs--Base Program and Changes (1985-1987). The overall mission of BLM is to manage public lands and their resources within its jurisdiction on the basis of multiple-use and sustained yield. To accomplish the mission, BLM must provide for the management, conservation, and protection of water resources on approximately 342 million acres of public lands administered by BLM. This requires the preparation and maintenance of a water resources inventory of all public lands, as well as analysis and evaluation of the occurrence, quality, and quanity of all surface- and ground-water resources on and under public lands.

BLM needs water quality and quantity data in the preparation and monitoring of land-use planning and management documents, mineral developments, environmental assessments, Federal, and State appropriated water rights claims, and technical support toward other resource activities.

BLM is authorized to inventory and monitor public land and water resources by the Federal Land Policy and Management Act of 1976. Data collection activities include the establishment of stream-gaging stations to monitor water quantity and quality of rivers and streams, as well as site-specific measurements of small water springs, wells, reservoirs, etc. Data collection and lab analyses of water samples are done in-house, by formal cooperation with the U.S. Geological Survey, State agencies, universities, and private laboratories. BLM most often cooperates with Forest Service, Soil Conservation Service, Bureau of Reclamation, and Fish and Wildlife Service in water data matters. Other water data are collected through BLM's watershed condition studies, floodplain appraisals, hazardous waste site investigations, ground-water investigations, and water-related research and development.

In 1984, an amendment to the Colorado River Salinity Control Act was passed that required BLM to develop a comprehensive program for minimizing salt contributions to the Colorado River from BLM-administered lands and submit a report to Congress by July 1, 1987. The report will describe BLM's salinity control work since 1975 and future control of diffuse and point sources of salinity. There is existing data to supplement future efforts; however, site-specific data will be needed to verify and validate salinity control projects.

It is expected that State water rights judical decisions will involve BLM's water uses on public lands. Water quantity data such as streamflow and use will continually be needed to support BLM's water-use needs.

In 1985, BLM initiated a riparian area management policy for intensifying protection and rehabilitation of these sensitive areas. Water resource information plays a key role in effective management of riparian areas. Hydraulic geometry, channel stability, instream flow, and water quality data will be necessary to assess and, if necessary, treat riparian areas on public lands.

Future Data Needs and Plans (1988 and Beyond). BLM will monitor its management activities to determine effects on water quality and quantity. New data will be collected only to the extent necessary for proper land management decisions. More reliance will be placed on existing data and state-of-the-art methods which enable less costly and more extensive data collection. Updates to an existing water-use data inventory will be required as changes to BLM's water-use programs occur. Water quality data bases for public lands will continually be increased, especially where resource impacts from hazardous wastes and nonpoint pollution are assessed.

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BUREAU OF RECLAMATION (BOR)

Agency Data Needs--Base Program and Changes (1985-1987). The mission of BOR is to develop, manage, and conserve our limited water and related land resources to meet the present and future requirements of the West. BOR is involved in the multipurpose development and conservation of the water resources of the 17 Western States. Project purposes include irrigation, hydropower, municipal and industrial supply, and enhancement of water quality.

BOR needs water data for planning (including environmental analysis), designing, constructing, and operating water resources developments. These needs are presently being met by the U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), Soil Conservation Service (SCS), States, universities, and the private sector, as well as by in-house data collection programs. BOR presently transfers funds to the USGS by means of a cooperative-type program for their services. In addition, contracts are negotiated with States, universities, and private organizations for their services. NOAA and SCS receive direct appropriations from Congress for their data collection programs.

No significant changes or new directions in water data programs are expected, except for a need for real-time data to improve forecasting procedures for floods.

a. Data collection for operating projects is quite stable.

b. Data collection for planning programs fluctuates with the budget.

c. Data collection for research is not large enough to be significant.

No new legislation, court decisions, etc., that would affect ongoing or near-term programs are foreseen. Some project facilities under construction, such as the Central Arizona Project, will require additional streamflow data within the project area. These will be financed by the water users.

Future Data Needs and Plans (1988 and Beyond). Improvements in forecasting the runoff from some of the major drainage basins, such as the Colorado River, are recognized, and more water quality data on herbicides, pesticides, and trace metals is needed; however, these needs must be considered among all Reclamation activities.

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FISH AND WILDLIFE SERVICE (FWS)

Agency Data Needs--Base Program and Changes (1985-1987). The mission of FWS is to provide the Federal leadership to conserve, protect, and enhance fish and wildlife and their habitat for the benefit of all people. The Service provides ecological expertise to all aspects of water resources planning, development, and management.

Habitat destruction is the greatest threat to fish and wildlife resources in the United States. Thus, the Service must maintain a high level of expertise in the various components of natural habitat, especially water-related components.

The Service depends on the numerous Federal and non-Federal agencies that produce basic water data. The data are used as fundamental input to many research, management, and consultation activities and are used to directly substantiate Service water rights. For example, water quality data are used in determining the effects of various pollutants on fish and wildlife, and flow data are used to establish instream flow requirements to maintain a viable fish habitat. Streamflow records maintained by the U.S. Geological Survey (USGS) and water quality data published by the Environmental Protection Agency (EPA) and various State agencies must be consistently available so that FWS can forecast the potential effects of proposed water resources development projects and waste-discharge proposals.

The Service's requirements for water information, principally basic data usable in developing ecological impact material and in appropriating, adjudicating, and protecting Service water rights, are largely being met. One major deficiency is representative stream cross section data in areas where flow gaging stations are maintained. Another deficiency is data on ground-water movement and on the relationship of ground water to surface water, especially in important wetland areas.

The FWS collects water data only when needed information is not available from other sources. Current data collection activities include: wetland classification and mapping; streamflow requirements for maintaining fish populations for use in the Instream Flow Incremental Methodology; factors affecting the habitat value of fish in aquatic areas for use in the Habitat Evaluation Procedures; national survey (cooperatively with EPA) of fishing status in the United States as input to EPA's national monitoring strategy; biological aspects of small-scale hydrodevelopment; characterization of the attributes, values, and vulnerability of various wetland types; dynamics of forest wetlands subject to periodic inundation; effects of channelization on different types of fish and wildlife habitat; maintaining gaging and water level stations on some refuges; periodically testing water quality at refuges and hatcheries; and fishery research on water-related problems.

For 1986 and 1987, increased budgets will be requested for wetland inventory and mapping activities. FWS is working cooperatively with USGS to provide National Wetland Inventory Maps to the general public.

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Future Data Needs and Plans (1988 and Beyond). For the long term, approximately the same budgetary resources are envisioned for these activities as are currently available, and no significant revisions in the program are anticipated.

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NATIONAL PARK SERVICE (NPS)

Agency Data Needs--Base Program and Changes (1985-1987). The mission of the NPS relating to water data is to preserve and protect the water resources and water-dependent environment of Park System areas; to provide potable water supply sources to meet visitor and employee water demands; to assist in the maintenance of water supply quantity and quality; and to establish, protect, and perfect Federal rights to water in all Park System areas.

To accomplish its mission the NPS conducts hydrologic studies to inventory known water sources--streams, lakes, springs, wells--and their present use and development, physical characteristics, and potentials. Paralleling the importance of knowledge of the physical characteristics of the water resource is a knowledge of the ownership and legal limits to which this resource may be utilized. To this end, NPS directs activities to investigate ownership, rights, and use of water for all park areas to facilitate the protection and, where appropriate, the perfection of water rights. Water resources activities involve collecting water resources and water rights data for general development plans, natural resources management proposals and plans, and wilderness studies; developing and maintaining water supply and sewage-disposal systems or methods; establishing water quality standards and criteria; formulating water quality management plans; conducting boundary studies; determining effects on park areas of developments on park water resources and related environments; preparing and/or assessing environmental impact statements; and maintaining, enhancing, or restoring water quality.

The water resources/water rights studies are generally conducted under interbureau agreements with other Federal agencies, principally the U.S. Geological Survey, or by contract with State agencies, universities, or private consultants. A limited number of studies are made by Service personnel.

The 1985 base program includes: (1) continuation of surface- and ground-water monitoring programs; (2) location of new or supplemental water sources for existing or proposed water systems to satisfy water demands at Park System areas; (3) delineation of floodplains and related flood hazards and development of water resources management plans for Park System areas; and (4) continuation of a riparian ecosystems research program.

Principal program changes for 1986-1987 will include the following: acceleration of the riparian ecosystems research program to establish correlation between stream quality/quantity with ecosystem viability; research on water-dependent threats to Park System resources; continuation of program emphasis on the development and implementation of water quality management plans and the establishment of water quality standards and criteria for designated instream uses in Park System areas; increased emphasis on monitoring programs to assess impacts on Park System area water quantity and quality from ongoing or proposed energy or other industrial developments; the quantification of current and future consumptive and nonconsumptive water uses for System areas as part of the Service's general management planning process; and increased emphasis on the delineation of floodplains and related flood hazards.

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Future Data Needs and Plans (1988 and Beyond). Program plans will involve an accelerated effort to adequately document known or suspected threats, as reported to Congress in the 1980 "State of the Parks" report, to Park System area water resources. Program emphasis will be on addressing identified categories of threats, including: inorganic and organic chemicals, salt/sediment deposition, unnatural flooding or flow decrease, thermal discharge, toxic chemicals, geothermal development, Outer Continental Shelf oil spills, acid deposition, and radioactivity. Planning and resource allocations will focus on potential and long-term threats, concentrating on appropriate "significant resource problems" and energy-related resource developments which affect water or riparian values of Park System areas. The Alaska Lands Act of 1980 established 11 new Park System areas totaling 31 million acres. The new Alaskan areas require significant assistance in water quality monitoring, comprehensive baseline studies, inventories of aquatic and riparian resources, flood-hazard delineations, and early location of ground-water sources to ensure potable water supplies. Minerals and other energy-development activities within and adjacent to several Alaskan parks further pressure the natural resources.

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OFFICE OF SURFACE MINING (OSM)

Agency Data Needs--Base Program and Changes (1985-1987). The enabling legislation of OSM (Public Law 95-87) contains provisions to allow for research and demonstration projects for coal development; to develop programs to reclaim abandoned mine lands; to develop data and assessment procedures to protect the hydrologic balance; and to collect hydrologic data for assisting small operators. All of these activities will directly or indirectly relate to water resources information and will be met through interagency agreements, contracts, and grants. However, close coordination is needed between Federal and State agencies and the private sector on data consistency, analysis and interpretation, and technology transfer to assure cost effectiveness and reliability relative to data acquisition activities.

OSM will embark on various water resources related activities, which will affect water-data acquisition and coordination. Existing systems will be used to coordinate storage and retrieval of data with the U.S. Geological Survey (USGS), the Environmental Protection Agency, and State water agencies in an effort to coordinate dissemination of data to coal operators via State regulatory authorities. Also, OSM is cooperating with the USGS, States, coal operators and consultants to develop guidance for preparing cumulative hydrologic impact assessments, determining probable hydrologic consequences, and implementing alternative sediment control methodologies.

In addition, an OSM program is available to assist small operators in collecting and analyzing certain hydrologic and geologic information. This will be coordinated through Federal and State agencies and contracted with qualified laboratories. Guidance materials and procedures will also be developed to assist all operators on water data collection and interpretation for permits and monitoring.

The critical data needs continue to be site-specific quantity and quality information for surface and ground water in small upland watersheds of less than 50 square miles. At present, streamflow and water quality data are available only for major or some secondary streams. Considerably more ground-water data are needed. This is especially important for the Eastern steep-slope coal fields where the greatest number of operators exist. For permitting purposes, operators need baseline data (prior to mining), which include the delineation of areas where coal or overburden contains acid forming or other toxic materials, and the interpretations of the extent of their impact on ground- and surface-water quality in these areas. Coupled with this is the need for a highly efficient system of determining the adequacy of existing data, recommending data needs, assessing data, and transferring this information to State regulatory authorities to determine additional data requirements for operators to meet permit requirements. This will be a continuing process because the intent is to continually improve the data base and transfer technology capabilities so that, with time, the cost of data collection per watershed area will be reduced and greater emphasis will be placed on transferring existing data. This effort will also require coordinating data collection efforts and providing data to agencies actively involved with reviewing permits and/or developing nonpoint-source models so that models will be improved for technology-transfer processes.

Future Data Needs and Plans (1988 and Beyond). No changes are expected.

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U.S. GEOLOGICAL SURVEY (USGS)

Agency Data Needs--Base Program and Changes (1985-1987). To accomplish its mission, the USGS Water Resources Division (WRD), in cooperation with State and local governments and other Federal agencies, conducts surveys, investigations, and research on the occurrence, quality, distribution, utilization, movement, and availability of the Nation's surface- and ground-water resources. An essential part of this activity is the systematic, nationwide program of data collection, analysis, and dissemination. As the principal Federal water-resources fact-finding agency, WRD provides information and technical assistance to officials at all levels of Government who are responsible for planning, design, and management decisions related to the hydrologic environment. The functions described above are supported by Federal appropriations (about $133 million in FY 1985), reimbursements from other Federal agencies (about $48 million in FY 1985), and by reimbursements from State and local agencies in the 50-50 matching Federal-State Cooperative Water Resources Program (about $55 million in FY 1985).

WRD provides assistance in terms of hydrologic data and information to other Federal agencies, bureaus, and offices (see Table 1). Cooperation in this regard is formal and is documented through various memoranda of understanding and interagency agreements. In addition, the National Weather Service utilizes data from more than 2,000 WRD-operated gaging stations on streams, lakes, and reservoirs for flow forecasting. Although these operations are closely coordinated by both agencies, no exchange of funds takes place and arrangements are handled by exchanges of correspondence and discussions at coordination meetings. The Federal-State Cooperative Program is carried out in conjunction with more than 800 State and local agencies through formal joint funding agreements, which are developed on an annual basis. Typically, these cooperators each year furnish $3-$5 million to WRD in unmatched funds for high-priority work. Thus, by far, the greatest part of USGS requirements for water information are met by activities performed in-house; the principal needs are to fulfill mission goals for furnishing hydrologic data and producing related analyses, interpretations, and research findings for the use of all agencies and citizens of the United States. The USGS data collection activities for FY 1985-1987 are summarized in Table 2.

Hydrologic data for analysis of the status of the Nation's water resources are essential ingredients of rational water planning and management. Without an adequate information base, assessments of the quantity and quality of surface and ground water would not be possible. Many data have been and are being collected, yet there remain some deficiencies in the temporal and geographical distribution and in the kinds of data available. This situation exists not only because of growth and shifts of the population and depletion of some local sources of water, but also because of the need for development and management of water resources on a large-scale regional basis. The urgency of maintaining at least the current level of monitoring efforts is evidenced by a growing demand for more and better water resources data. In addition, ensuring the long-term integrity of water data networks is crucial to their usefulness in detecting trends to identify problems and evaluate improvements.

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TABLE 1

Other Federal Agencies for which USGS Conducts Hydrologic Investigations and Data Collection on a Reimbursable Basis

Department of Agriculture

Department of Defense

- Military
- Civilian

Department of Commerce

- Bureau of Census
- National Oceanic and Atmospheric Administration

Department of Energy

- Bonneville Power Administration

Department of the Interior

- Office of the Secretary
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Minerals Management Service
- National Park Service
- Office of Surface Mining

Department of State

- Agency for International Development
- International Joint Commission

Department of Transportation

Environmental Protection Agency

Federal Emergency Management Agency

Tennessee Valley Authority

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TABLE 2

Water Data Collection Activities of the U.S. Geological Survey, FY 1985-FY 1987*

TYPES OF STATIONS

Continuous Record: The station is instrumented to monitor hydrologic conditions continually and, in some instances, transmit data in real time.

Partial Record: Hydrologic information is collected only during selected periods, for example, during floods.

Scheduled, Long-Term Operation: Hydrologic information is collected on a fixed schedule over a long period to detect trends.

Short-term or Project Stations: Hydrologic information is collected to meet the needs of a specific study. Data those available from scheduled long-term continuous records, and partial record stations.

NUMBER OF STATIONS

Column A--Stations totally supported by funds appropriated to the Geological Survey Federal Program subactivity.

Column B--Stations supported by funds appropriated to the Geological Survey Federal-State Cooperative Program subactivity.

Column C--Stations totally supported by reimbursement from other Federal agencies.

Column D--Stations supported by a combination of two or more of the above.

*Based on a nationwide inventory of data collection activities conducted on an annual basis by the U.S. Geological Survey.

TYPES OF STATIONS	NUMBER OF STATIONS				
	A	B	C	D	
	Federal Program	Federal/State Cooperative Program	Other Federal Agencies	Combined Support	Total
FY 1985 (Actual)					
SURFACE WATER					
Discharge					
Continuous Record	554	3,223	1,607	1,635	7,019
Partial Record	84	3,013	293	667	4,057
Stage Only--Streams					
Continuous Record	13	198	212	24	447
Partial Record	14	418	45	30	507
Stage Only--Lakes/Reservoirs					
Continuous Record	21	338	254	169	782
Partial Record	11	278	67	49	405
Quality					
Continuous Record	111	284	252	96	743
Scheduled, Long-term	519	1,346	352	229	2,446
Short-term or Project	74	718	124	61	977
GROUND WATER					
Water Levels					
Continuous Record	94	1,783	215	192	2,284
Scheduled, Long-term	809	17,964	1,501	3,221	23,495
Short-term or Project	2,973	7,411	974	636	11,994
Quality					
Scheduled, Long-term	52	3,796	193	293	4,334
Short-term or Project	546	3,709	468	206	4,929
FY 1986 (Estimate)					
SURFACE WATER					
Discharge					
Continuous Record	560	3,220	1,520	1,700	7,000
Partial Record	80	3,020	290	670	4,060
Stage Only--Streams					
Continuous Record	10	200	210	30	450
Partial Record	10	420	50	30	510
Stage Only--Lakes/Reservoirs					
Continuous Record	20	340	250	170	780
Partial Record	10	280	70	50	410
Quality					
Continuous Record	110	280	250	100	740
Scheduled, Long-term	510	1,350	350	230	2,440
Short-term or Project	100	720	130	60	1,010
GROUND WATER					
Water Levels					
Continuous Record	90	1,780	20	190	2,280
Scheduled, Long-term	810	17,960	1,500	3,220	23,490
Short-term or Project	2,970	7,410	970	640	11,990
Quality					
Scheduled, Long-term	50	3,800	190	290	4,330
Short-term or Project	550	3,730	470	200	4,950
FY 1987 (Estimate)					
SURFACE WATER					
Discharge					
Continuous Record	560	3,220	1,520	1,700	7,000
Partial Record	80	3,020	290	670	4,060
Stage Only--Streams					
Continuous Record	10	200	210	30	450
Partial Record	10	420	50	30	510
Stage Only--Lakes/Reservoirs					
Continuous Record	20	340	250	170	780
Partial Record	10	280	70	50	410
Quality					
Continuous Record	110	280	250	100	740
Scheduled, Long-term	510	1,350	350	230	2,440
Short-term or Project	100	720	130	60	1,010
GROUND WATER					
Water Levels					
Continuous Record	90	1,780	20	190	2,280
Scheduled, Long-term	810	17,960	1,500	3,220	23,490
Short-term or Project	2,970	7,410	970	640	11,990
Quality					
Scheduled, Long-term	50	3,800	190	290	4,330
Short-term or Project	550	3,730	470	200	4,950

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National concern with the impacts of hazardous substances on water resources will likely continue to be one of the most significant issues of the remainder of this century. This, along with municipal, industrial, and agricultural water supply needs, problems with respect to floods and droughts, and requirements for power generation, transportation, environmental improvement, and recreation, clearly demonstrate the increasingly dramatic necessity for reliable hydrologic information. The USGS program activities, as described above, are furnishing much of the required data through a series of highly coordinated and mutually interdependent funding arrangements. Many agencies at all levels of Government participate in these efforts and benefit from the products resulting from the entire program, as do other nonparticipating agencies, academia, the private sector, and the general public. Thus, seemingly small modifications to the data networks can have far-reaching effects on a wide variety of data users. With this in mind, it is clear that efforts to coordinate and maintain the integrity of this program have never been more important.

Requests for increases and decreases (dollars, in thousands) included in the President's FY 1986 Budget for USGS are as follows:

° Federal Program

Data Collection and Analysis (+$1,000)--The funding increase will provide needed enhancements to Federal hydrologic data collection and analysis activities. Particular emphasis will be directed to (1) rehabilitation and improved servicing for the nationwide network of stations; (2) maintenance of critical national water data networks; and (3) provision of hydrologic information used in analyses for quantification of Indian water rights.

Toxic Substances Hydrology (+$1,000)--This increase will provide funds to accelerate research and investigations on toxic substances in the Nation's physical, chemical, and biological processes involved in the movement and fate of these substances in water; (2) modeling the movement of sediment and associated toxic substances in water; and (3) beginning a new river basin investigation and continuing two others started in 1985.

Coal Hydrology (-$962)--Funding for this program will be reduced to zero from $962 in FY 1985. Beginning in 1986, all coal hydrology activities of the USGS will be carried out through the Federal-State Cooperative Program or through reimbursable funding from other agencies.

° Federal-State Cooperative Program

Data Collection and Analysis (+$962)--This increase will fund an expansion of the Federal-State Cooperative Program to provide scientific and technical assistance, on a cost-sharing basis, related to ground-water protection. This program expansion responds to the Environmental Protection Agency's (EPA) recent Ground Water Protection Strategy and will help guide management decisions in ground-water protection.

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° Water Resources Research Act

State Water Resources Research Institutes (-$1,000)--Funding for the State Water Resources Research Institutes Program (Section 104 of the Water Resources Research Act of 1984) would be reduced to $5.2 million. In 1986, as in 1985, the institutes with research proposals in excess of their grant allotment could compete for funding under the Water Resources Research Grant Program (Section 105).

Final actions on the FY 1986 Budget, including decisions on pay raise supplements and on savings from various "Management Improvement Initiatives," may have substantial impacts on the increases and decreases shown above.

° National Water-Quality Assessment Program

A recent markup of a House committee report on the FY 1986 appropriations bill recommends that $5 million be identified "to enable the Geological Survey to develop detailed plans and take the initial steps in implementing a national water-quality assessment program. Such a program should define exisiting conditions, identify current and approaching water quality problems, detect changes in water quality, and study the causes and effects of water quality problems in both surface and ground waters. The committee expects the Department and the Survey to recommend a comprehensive program in this area and to request sufficient resources to carry it out." The Department of the Interior and the Survey are currently exploring potential funding and coordinated considerations associated with this recommendation.

With respect to FY 1987, no programmatic increases or decreases have been approved by the Secretary of the Interior as of August 1985. Therefore, the FY 1987 budget submission to the Office of Management and Budget is currently projected to be at the FY 1986 funding level as proposed by the House.

Legislation and other actions are expected to continue to significantly affect the programs of other Federal and State agencies, particularly with respect to water supply and quality. Modifications in this regard also will impact USGS activities. Additional water resources investigations and hydrologic data collection related to impacts of hazardous wastes and proposed remedial action will be needed. It is anticipated that USGS will increasingly be requested to tailor reimbursable programs in data collection and analytical laboratory services in support of these requirements.

Future Data Needs and Plans (1988 and Beyond). For 1988 and beyond, it is anticipated that requirements for hydrologic information will continue to increase. The principal emphasis is expected to be on water quality, toxic waste hydrology, and water supply and demand. The most significant efforts will likely be in further support of: (a) State and local agencies on ground-water contamination and related issues, as part of their responsibilities in the implementation of the EPA Ground-Water Protection Strategy, and (b) expansions in the National Water Quality Assessment Program, which is geared to define the status and trend of the Nation's surface- and ground-water quality, and to evaluate the potential effects of proposed remedial and protective actions. It is, however, too early to postulate program changes for FY 1988.

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DEPARTMENT OF TRANSPORTATION

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FEDERAL HIGHWAY ADMINISTRATION (FHWA)

Agency Data Needs--Base Program and Changes (1985-1987). The mission of the FHWA is to promote the general welfare, the economic growth and stability of the Nation, and its security through the development of national transportation policies and programs conducive to the provision of fast, safe, efficient, and convenient transportation consistent with utilization and conservation of the Nation's resources.

To support the design of fast, safe, efficient, and economical transportation facilities, a network of stream-gaging stations is necessary to estimate design flows for sizing hydraulic structures. The network is operated by other agencies, primarily the U.S. Geological Survey (USGS).

It is also necessary to establish a water quality data base so that the effects of transportation construction, maintenance, and operation on the water quality of the Nation's streams can be evaluated and mitigated. Primarily, data collected by other Federal and State agencies is utilized.

The Department of Transportation participates in the National Small Rural Watershed Program with several States and USGS. This program contributes to improved procedures for estimating flood flows and the effect of urbanization on flood flows at highway stream crossings.

The Department is also involved in the collection of water quality data for research and project monitoring. These data are being utilized to define the constituents, migration, and impacts of pollutants in transportation-related runoff, and to improve mitigation measures employed during construction and operation of transportation facilities.

Future Data Needs and Plans (1988 and Beyond). The need for more complete flood-flow information will remain great, but the need for collecting flood-flow data will moderate with the emphasis shifting toward methods of extracting increased information and the design of more effective data collection networks. There will be a decreasing need for the collection of water quality data to define the effects of transportation facilities on the environment as highway agencies develop and gain confidence in predictive procedures and models to assess such impacts.

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INDEPENDENT AGENCIES

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COUNCIL ON ENVIRONMENTAL QUALITY (CEQ)

Agency Data Needs--Base Program and Changes (1985-1987). The mission of CEQ is to advise the President, the Congress, Federal agencies, and the public regarding conditions and trends in the quality of the environment; to review and appraise Federal environmental programs and policies; to review the adequacy of systems for monitoring and predicting environmental changes; and to collect, collate, analyze, and interpret data and information on environmental quality. Water resources data is but one component of the environment that CEQ considers.

CEQ requires many types of water data for national policy studies and environmental quality assessments. Water quality data are typically from the U.S. Geological Survey National Stream-Quality Accounting Network (NASQAN) and from the Environmental Protection Agency (EPA); wetlands data are obtained from the Fish and Wildlife Service National Wetlands Inventory; marine and coastal water quality information are obtained from the National Oceanic and Atmospheric Administration; and acid deposition data from the National Acid Precipitation Assessment Program. In addition, CEQ relies on data from State monitoring programs, from international sources, and from special studies by agencies. Because CEQ requires data that are compatible for multimedia analysis covering pollution effects, human health, air quality, land use, and economic and industrial features, it must rely on the data acquisition programs of many other agencies as well.

CEQ was provided $175,000 from funds previously appropriated, to be expended in Fiscal Years (FY) 1984 and 1985, to strengthen the technical and scientific expertise of the Council. During FY 1985, these funds will be used to lay the groundwork for a major effort in FY 1986 to publish a second Environmental Trends report and to improve upon the indicators of environmental quality that are in common usage. CEQ initiated an interagency working group at the end of FY 1985 to assist in this effort.

During FY 1985, CEQ transferred the Chemical Substances Information Network (CSIN) technology to EPA. This computer software technology enables a user of chemical information and data to access as many as 400 different data bases without having to employ the unique language of each system--a substantial saving in time and money. CEQ shepherded the development of the system and, when it was proven effective and useful, released it to an agency with the need and resources to implement it.

The National Acid Precipitation Assessment Program, an interagency program housed at CEQ, is charged with developing and improving an objective and comprehensive information base. Established in 1980, it was given a 10-year renewable mandate with annual reporting requirements. Its budget, obtained from several agencies, has increased from $18 million in FY 1982 to over $80 million in FY 1986.

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Future Data Needs and Plans (1988 and Beyond).

No significant changes or thrusts are anticipated. CEQ expects to continue publishing its annual report, providing financial management and programmatic guidance to the Acid Precipitation Program, working toward the improvement of indicators of environmental quality, and developing a system for regular updating of environmental data used in the CEQ Annual Reports.

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ENVIRONMENTAL PROTECTION AGENCY (EPA)

Agency Data Needs--Base Program and Changes (1985-1987). EPA's mission with respect to water quality is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Within the framework of this mission, EPA is responsible for conducting related research and demonstration projects; establishing and enforcing water-quality standards; monitoring water quality; and defining technology-based and water-quality based pollution controls while, at the same time, progressing toward a greater understanding of the environment as a single system of interrelated parts.

Water-quality data are needed to support a large number of EPA, State, and local problem assessment and pollution-abatement programs. Physical, chemical, and biological measurements of water are needed to assess degrees of pollution, the sources of pollution, the effect of the pollutants on the waterways, and the effectiveness of Federal or State pollution-abatement programs. The data are analyzed and used to assess the Nation's water quality. These assessments include the biennial Water-Quality Inventory Report based on the State submissions under Section 305(b) of the Clean Water Act and other specialized water-quality analyses that summarize EPA and other water-quality data. The data on which assessments are based are derived primarily from State, EPA, and U.S. Geological Survey (USGS) monitoring efforts. EPA and USGS also are coordinating their overall water quality assessment programs through special task forces for surface-water monitoring and ground-water monitoring.

As reflected in the EPA's Office of Water Regulations and Standards "Monitoring Strategy for Inland and Coastal Waters," water monitoring has six major areas of emphasis: (1) Regulatory Monitoring; (2) National and Regional Assessment; (3) Program Evaluation Monitoring; (4) Clean Water Act Implementation Oversight; (5) Data Quality Improvement and Control; and (6) Integrated Data Management for Improved Decisionmaking.

Included above, under "Program Evaluation Monitoring," is the "National Dioxin Study." This study involved extensive statistical design efforts and a broad range of monitoring ranging from soil, sediment, and water, through fish tissue. An extension of the study, the Bioaccumulation Study, examines a much wider range of dioxin isomers and other pollutants which could present a threat to human health due to bioaccumulation in the aquatic food chain. The study will utilize fish tissue samples collected from the background ambient sites during the national dioxin study to evaluate the extent of contamination of a national level for about 50 pollutants. In addition, the study will involve collecting additional samples in areas of suspected contamination from a small subset of these pollutants. This study will be conducted during FY 1986 and FY 1987.

EPA's Office of Ground Water Protection (OGWP) has developed and is responsible for implementing a Memorandum of Understanding between USGS and EPA. One of the key areas of concern is ground-water data management. In addition, OGWP has developed a "Ground Water Monitoring Strategy" which has seven major areas of emphasis; (1) resource characterization, (2) problem identification,

(3) problem assessment and regulation development, (4) compliance, (5) effectiveness of ground-water protection, (6) data quality improvement, and (7) data management.

As part of the ground-water data management effort, EPA is conducting a requirements analysis to determine: (1) specific user needs for ground-water data, (2) systems and networks to address those needs, and (3) a place for implementing the system needs.

Future Data Needs and Plans (1987 and Beyond). Other program evaluation studies such as the Dioxin study, which will generate new data needs and involve extension and development of new methodologies, are anticipated. Emphasis will continue in the area of toxic pollutants in general, with concurrent need for expansion in bioassay and biomonitoring techniques. Ground-water protection will continue as an issue of major emphasis.

U.S. SECTION; INTERNATIONAL BOUNDARY AND WATER COMMISSION (IBWC)

Agency Data Needs--Base Program and Changes (1985-1987). The Commission is responsible for executing the provisions of existing treaties and other agreements between the United States and Mexico relating to boundary water matters. The treaties and agreements provide for: (1) the distribution of the waters of the Rio Grande and the Colorado River between the two countries; (2) the regulation and conservation of the waters of the Rio Grande by international diversion dams and storage dams and reservoirs so that the two countries obtain optimum utilization of their water allotments; (3) the protection by levees and floodways of lands along the river from floods; (4) the maintenance of the Rio Grande and Colorado River as the international boundary; (5) the preferential attention to the solution of border sanitation problems; and (6) maintenance of the international land boundary monuments.

To accomplish its mission, the IBWC collects water data, which include precipitation, streamflow, ground water, and water-quality information, along the international boundary. Assistance is provided by State and Federal agencies in both countries.

Personnel in eight United States field offices along the Mexican border are continuing to collect data required by the treaties, with an increasing importance on water-quality data relative to sanitary contamination.

The collection of basic hydrologic data is expected to remain at the same level with increasing efforts to delineate and resolve specific border sanitation problems.

Future Data Needs and Plans (1988 and Beyond). It is expected that data on ground-water resources and water quality will continue to be needed in the coming years, as well as data on unapportioned waters of streams crossing the international boundary.

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NUCLEAR REGULATORY COMMISSION (NRC)

Agency Data Needs--Base Program and Changes (1985-1987). NRC was established by Congress under the Energy Reorganization Act of 1974. The primary goal of NRC in licensing and regulating nuclear reactors is to assure the health and safety of the public and to protect the environment. Similarly, NRC has charge of insuring safe, permanent disposal of radioactive wastes by licensing nuclear activities and facilities, and by protecting the public against the hazards of low-level radioactive emissions and releases from the licensed nuclear activities and facilities.

To accomplish its mission, NRC requires that an applicant for a construction permit and an operating license for a nuclear facility provide a variety of data about the maximum hydrologic events that may potentially affect the safety-related facilities and the site (e.g., hurricanes, river floods, low river flows, dam failures, precipitation, droughts, tsunamis, etc.), assuring an adequate safety-related water supply, and analyzing environmental effects caused by construction and operation of these facilities.

The Atomic Energy Act of 1954 was amended to limit the discharge of radioactive liquid effluents into ground and surface waters and to protect nuclear facilities from flooding. The Uranium Mill Tailings Radiation Control Act of 1978 was also amended to limit the discharge of radioactive effluents into ground and surface waters. The Nuclear Waste Policy Act of 1982 directs NRC to promulgate criteria for the licensing of high-level waste geologic repositories. NRC has responsibility to review Department of Energy (DOE) submittals up to and including the actual licensing applications. The NRC will then grant a license based upon this review. Although much of the water data submitted to NRC is from previously published sources, some is collected by applicant or licensee monitoring programs. These monitoring programs are reviewed by NRC staff with occasional confirmatory sampling by NRC regional inspection personnel. The periods of record and parameters monitored are site-specific and involve both safety and environmental concerns.

The NRC base program for water data acquisition addresses the overall licensing programs and NRC organizational goals. The NRC program does not involve direct field data collection; rather, it involves review and analysis of data provided by licensees, contractors, and other Government agencies. In order to understand and adequately review hydrologic issues, the NRC has either funded or collaborated with other Federal agencies in funding technical assistance and research contracts. The NRC staff effort involves monitoring the work being performed under contractual agreements with private consultants, national laboratories, universities, and other Government agencies.

The NRC short-term program plans support licensing activities. The principal topics addressed in both staff analyses and contractor assistance work are ground-water contamination pathway analyses, hydrodynamic measurements, analysis of flood hazards, and hurricane surge monitoring. In high-level waste management, research projects dealing with ground-water transport of radionuclides in porous and fractured rock, unsaturated flow and transport in

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fractured rock and hydrogeologic site characterization techniques are being funded. Specific projects for site characterization techniques are ground-water dating, geochemical laboratory and field studies, in situ geologic and hydrologic measurement verification, and unsaturated zone instrumentation and analysis techniques.

In low-level waste management, studies are concerned with ground-water flow and solute transport in the unsaturated zone and related site monitoring techniques in near surface, unconsolidated materials. Stochastic analysis of solute tranport in unsaturated soils, site characterization techniques, verification studies at specific low-level waste facilities, quality control of water data measurements, and studies of chemical speciation and mobility are being conducted.

In reactor siting, the greatest use of water data will be in analysis of water data independently collected by the licensees at commercial reactor sites. These analyses also utilize water data previously collected by the U.S. Geological Survey (USGS) and the Corps of Engineers.

Studies of uranium milling and mining facilities, including Uranium Mill Tailings Remedial Action Programs sites, are concerned with methods to minimize ground-water contamination from uranium recovery operations. Model evaluation of seepage from uranium tailing disposal above and below the water table and aquifer restoration at in-situ leach uranium mines involve ground-water flow and transport studies.

Future Data Needs and Plans (1988 and Beyond). The NRC long-term programs dealing with water data and water data acquisition will evolve to keep pace with the needs of the nuclear industry. In the area of high-level waste (HLW) management, work will concentrate on environmental and safety assessments including modeling studies for HLW repository sites. Review of hydrologic data and interpreted results by DOE, USGS, and other Federal agency and sub-contractor studies of potential HLW sites will involve NRC staff and contractor analysis. Similarly, low-level waste management work will center on shallow land burial site assessment closure procedures to control and minimize infiltration and the assessment of alternative disposal techniques. A field validation study of stochastic hydrogeologic methods was recently begun for shallow land burial applications. Work on stochastic methods for assessing the probabilities of severe hydrologic events at nuclear reactor sites has also begun. Future work will concentrate on enhancement and testing of the developed methodology using selected watershed data.

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TENNESSEE VALLEY AUTHORITY (TVA)

Agency Data Needs--Base Program and Changes (1985-1987). TVA was created in 1933 as a regional resource development agency. Development and management of the water resources of the Tennessee Valley for the overall benefit of the people is a major responsibility. Protection and enhancement of environmental quality is an integral part of the development program. TVA operates a system of dams and reservoirs on the Tennessee River and its tributaries to provide flood control, navigation, and hydroelectric power, in addition to water supply and recreation uses. TVA collects hydrologic and water quality data for its own needs and to help ensure wise uses of resources. The data is disseminated to others in a variety of ways and is entered into STORET and WATSTORE.

TVA's water data needs include information required for operations of the reservoir system and basic information on water resources of the Valley--precipitation and quantity and quality of surface and ground water. Data are collected in-house and through cooperative agreements, principally with the U.S. Geological Survey and the National Weather Service. Water quality monitoring activities are coordinated with State agencies as well. TVA, which has no regulatory authority, works with Federal and State regulatory agencies to correct water quality problems.

The hydrologic reporting network for precipitation and streamflow data is operated principally for reservoir operations planning. It presently consists of 167 precipitation gages, 132 of which are automatic, and 32 stream gages, all of which are automatic. In 1984, six Geostationary Operational Environmental Satellite data collection platforms became operational as part of TVA's dam safety program for Blue Ridge Dam in northern Georgia. The receiving station is in Knoxville. Data from the reporting network are received by a central computer in Knoxville and are automatically processed. After validation, the data are stored on magnetic tape. Weekly summaries are automatically produced for distribution. Because of the unavailability of funds, 24 precipitation gages continue to be manually observed.

TVA will continue activities in mapping of flood-prone areas under funding from the Federal Emergency Management Agency.

Future Data Needs and Plans (1988 and Beyond). In the long term, TVA's water-resources programs will place new emphasis on monitoring, the development of a comprehensive water resources information base, and demonstrations of practical approaches to preventing degradation of water resources.

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APPENDIX C

EPA/DOI
MEMORANDUM OF UNDERSTANDING
ON GROUND-WATER PROTECTION

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APPENDIX C

MEMORANDUM OF UNDERSTANDING BETWEEN THE
ENVIRONMENTAL PROTECTION AGENCY AND THE DEPARTMENT OF THE INTERIOR

RELATING TO

RELATIONSHIPS IN ACTIVITIES RELATED TO THE PROTECTION
OF THE NATION'S GROUND-WATER QUALITY

The purpose of this memorandum is to formalize cooperation and document agreements between the Environmental Protection Agency (EPA) and the Department of the Interior (DOI) in the area of ground-water quality.

The memorandum is divided into two parts: Part I pertains to the water-quality activities of EPA and the U.S. Geological Survey (USGS), and Part II pertains to the interactions between EPA and DOI relating to activities authorized by P.L. 98-434, the High Plains States Groundwater Recharge Demonstration Program Act of 1983.

Part I--Water-Quality Activities of EPA and USGS

With regard to water-quality activities of the EPA and USGS, this memorandum is based on the following premises: (1) USGS is responsible for developing basic scientific information on the ground-water environment through research, investigations, and data collection, including base line information on hydrologic, geochemical, and biologic processes, distribution and composition of water-bearing materials, artificial recharge potential and impacts, and the sources, quantities, qualities, distribution, and behavior of the ground-water resources; these responsibilities derive from the statutory authorities defining the USGS and its mission, including the Organic Act of 1879 and the subsequent annual appropriation acts authorizing USGS programs; and (2) EPA is responsible for carrying out its statutory authority over sources of ground-water contamination. Those authorities cover a wide range of responsibilities which include, for example, (1) establishing standards for treatment, storage, and disposal of hazardous waste (RCRA); (2) responding to releases or substantial threats by releases into the environment, including ground water, of any hazardous substance, pollutant, or contaminant which may present an imminent and substantial danger to the public health and welfare (CERCLA); (3) setting maximum contaminant levels and monitoring requirements for public water systems, and regulating uses of underground injection wells to protect underground sources of drinking water (SDWA); (4) controlling the use of pesticides (FIFRA); (5) restricting or prohibiting the manufacture, distribution, and use of products presenting an unreasonable risk of injury to health in the environment (TSCA); (6) regulating cleanup and disposal related to uranium mill tailings (UMTRCA); (7) establishing standards related to certain radioactive materials (AEA); and (8) promoting the development of State plans for ground-water protection (CWA). Each of these acts seeks to protect ground water at a principal or subsidiary point of vulnerability. As an integral part of its mission, EPA conducts research and other support activities.

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This memorandum is a statement of mission, intent, capability, and implementation process. The Chief Hydrologist will coordinate the provisions of Part I of this MOU for the USGS. The Director, Office of Ground-Water Protection, will coordinate the provisions of Part I of this MOU for the EPA. Issues that cannot be resolved at this level will be elevated to higher levels.

SCOPE AND RELATION OF AGENCY PROGRAMS

The EPA, as a regulatory agency, and the USGS, as a natural resource research and investigation agency, are involved in a number of related activities. Coordination of certain of the two agencies' activities is vital to the achievement of national environmental and resource management goals and to the efficient and effective acquisition of resource data. Those activities of particular concern include research, data collection, and technical assistance related to ground-water quality protection.

The EPA has the Federal responsibility for implementing various statutory programs, eight of which relate substantially or in part to the detection, cleanup, or protection of ground water. Many of these programs are implemented largely through the States, and they involve the development and enforcement of nationwide regulations, the conduct of investigations and surveillance, support for planning and technical assistance, and State grant support. EPA recently issued its Ground-Water Protection Strategy (August 1984), which recognizes the growing concern over ground-water contamination, and the role of the States in protecting the resource. The strategy addresses four major areas: (1) strengthening State capacity to carry out their responsibility, (2) controlling currently unaddressed sources of ground-water contamination, (3) achieving consistency among the various ground-water protection efforts in the agency taking the value of the resource into consideration, and (4) creating an organizational focus for ground-water protection at Headquarters and the Regions.

The Ground-Water Protection Strategy also recognizes the need to incorporate USGS hydrologic expertise and capability in activities relating to ground-water quality protection. Relevant USGS activities related to ground-water quality protection include basic research, areal investigations at the local, regional, and national levels, the collection and analysis of water-quality data in support of research investigations, and technical assistance. Some of these activities are funded entirely through appropriations to the USGS under its Federal Program; others are funded jointly by the USGS and by State or local governments under the USGS's Federal/State Cooperative Program; still others are funded by other Federal agencies.

Both USGS and EPA have extensive formal and informal working relationships with State and local governments, e.g., the Federal/State Cooperative Program of the USGS, and the delegation of program and regulatory authority to the States by EPA.

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AREAS OF CONSIDERATION

I. Data Collection and Areal Investigation

Both the USGS and EPA obtain ground-water quality data and conduct areal investigations related to the ground-water resource, although EPA's efforts relate principally to its regulatory mandate. Each agency's area of responsibility is described below. Neither agency can fulfill its mission without maintaining in-house activity in water-quality data collection and analysis and areal investigation, nor, particularly in the case of EPA, without maintaining the capacity to contract effectively for this type of work. Coordination between the two agencies is maintained at all levels to ensure that no unnecessary duplication of effort occurs and that the activities of the two agencies are fully complementary.

Responsibilities--USGS

The USGS collects basic data on the quantity and quality of the Nation's ground-water resources, both on a broad scale and on a local or site-specific scale where particular problems have been identified. On the national scale, each District Office of the Water Resources Division (WRD) of the USGS collects and maintains records of water levels in a network of observation wells throughout its area of responsibility. Data on ground-water quality are collected as opportunities arise or as needed in specific areas, and records are maintained both in District and national files. In addition, a USGS program is underway to assemble information on shallow ground-water quality as related to land use in typical hydrogeologic settings throughout the country. On the local or site-specific scale, many USGS District Offices conduct ground-water quality data collection and analysis programs in the vicinity of hazardous waste sites or water-supply wells, particularly as a follow-on activity after completion of an areal hydrogeologic investigation of the site.

The USGS conducts areal hydrogeologic investigations to evaluate and describe the ground-water resource, or to analyze particular problems related to ground-water quantity or quality. In recent years, these problem-oriented investigations have focused increasingly on ground-water contamination, both from point and nonpoint sources. In many Districts, highly advanced studies have been undertaken, involving simulation of the movement of contaminants away from a waste site, and analysis of possible chemical reactions affecting the contaminants. These studies, while focused on specific sites or areas, are commonly supported by research activities that are essential to the development of hydrologic understanding. The scope of USGS research activities is explained in a later section.

Responsibilities--EPA

EPA has a statutory responsibility for monitoring ground-water quality relating to (1) the development and enforcement of standards and regulations under the agency's statutory responsibilities, such as those pertaining to the permitting of hazardous waste disposal and storage facilities,

and the protection of drinking water delivered by public systems; (2) determining existing or potential contamination problems to assess the need for new or modified programs, regulations, and corrective actions necessary to protect public health and the environment; and (3) maintaining an awareness of the degree and seriousness of the ground-water contamination problem, and of the types and levels of human activities that impact the quality of the ground water.

These responsibilities will require that EPA undertake special studies relating to the types, sources, distribution, and magnitude of contaminants posing threats to the quality of the ground water of the Nation.

Cooperative Activities

-- USGS will make available to EPA data collected in its water programs which are useful to EPA--for example, data pertaining to the nature and extent of ground-water systems, sources of contamination, waste management operations, and appraisal of subsurface injection or burial sites. Similarly, EPA will make available to USGS data and other information collected in its programs which are pertinent to studies being conducted by USGS.

-- As provided in the Interagency Agreement between USGS and EPA (Office of Waste Programs Enforcement), dated October 1, 1983, USGS will perform geologic, geochemical, and geohydrologic investigations of specific areas to provide information needed by EPA for evaluating, monitoring, controlling, and abating ground-water contamination at existing and proposed waste storage, treatment, and disposal facilities.

-- USGS will as mutually agreed upon provide assistance in the development of monitoring studies and guidelines, and the conduct of related technical studies.

-- USGS will participate with EPA in the development of the EPA Ground-Water Monitoring Strategy as a member of the EPA sponsored Ground-Water Monitoring Work Group.

II. Technical Assistance

Both EPA and USGS provide extensive assistance to State, local, and Federal agencies. USGS focuses on the scientific understanding of the ground-water resource. EPA focuses on carrying out its statutory and regulatory mandates in an effective and scientifically sound manner.

Responsibilities--USGS

The USGS carries out extensive technical assistance efforts to local, State, and other Federal agencies in the field of ground water, particularly by providing information on (1) the available quantity and quality of ground water and the current uses of the resource; (2) the probable impacts of various ground-water development scenarios; (3) the movement and fate of contaminants in ground water; and (4) the significance of research results to

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water management and water-quality protection. Much of this assistance is provided through the previously mentioned Federal/State Cooperative Program of the USGS. The information is disseminated through reports, computerized information services, training programs, and direct interaction between USGS personnel and personnel of State and local governments or of other Federal agencies.

Responsibilities--EPA

EPA is responsible for providing technical assistance to State and local governments in support of its regulatory efforts. This includes assistance (1) on the provisions of regulations, permits, pesticide labels, and other program requirements that relate to ground water, (2) on the development of State ground-water protection programs under the Clean Water Act authorities, (3) in the cleanup of hazardous waste sites under Superfund, (4) under the emergency provisions of various laws, and (5) under other statutory provisions.

Cooperative Activities

-- USGS will provide access to ground-water data and information in office and central computer files (WATSTORE and GWSI) to State, local, and Federal agencies. Information in report form will be made available through established assistance centers such as those maintained by NAWDEX. As part of its training program, available data services and assistance will be described to trainees, and access to USGS facilities will be arranged. EPA will provide access to STORET and other sources of data and information.

-- EPA and USGS jointly will explore avenues for improving access to information; e.g., direct access to computer files via terminals, joint information service centers for disseminating data and program products, and training sessions that incorporate information transfer activities of both organizations. For example, EPA and USGS will establish a joint review of the use of a geobased information system (GIS) for use in ground-water protection efforts at the Federal, State, and local levels.

-- EPA and USGS will develop an arrangement at each EPA regional office to promote cooperative efforts among USGS, EPA, and the States. For example, USGS will cooperate with States as they develop State ground-water protection programs including the development of State guidelines and regulations, monitoring and mapping efforts, and other technical activities identified by States as high priorities in their State ground-water protection strategies, State plans, or State grant reports to EPA. In general, requests for such assistance will be initiated by the States and conducted under the USGS Federal/State Cooperative Program.

-- USGS will prepare reports for each State describing the availability of published information on ground water, and describing ongoing ground-water investigations.

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-- USGS will identify activities in the ongoing water-use program that will contribute to State ground-water protection efforts.

-- USGS will make their training program on ground water and related subjects available to EPA personnel and personnel from State ground-water protection programs.

-- EPA will foster the use by States of hydrologic assistance from the USGS through the USGS Federal/State Cooperative Program.

-- USGS will support the preparation of standards, guidelines, and regulations through the provision of data, geohydrologic information, and information on water-bearing characteristics of ground-water flow systems. For example, USGS will participate as a member of the EPA Task Group which is developing EPA Ground-Water Classification Guidelines.

-- USGS will provide data, technical assistance, and advice, as appropriate, under the terms of the USGS/EPA interagency agreement dated October 1, 1983, in support of EPA enforcement actions under its statutory provisions.

III. Research

The EPA's statutory mandates to protect ground-water quality frequently involve EPA and the States in complex technical questions. These questions deal with the entire range of processes affecting ground-water contamination; they arise, for example, during the development of regulations, during the course of litigations, and during the design of remedial actions. Thus, in carrying out regulatory functions, the EPA and the States must frequently operate at the limits of scientific knowledge. Scientific and engineering expertise is necessary to permit rapid and flexible adjustment to shifting priorities, to provide a source of technical advice to management, to provide guidance in planning and evaluating extramural research, and to ensure that the agency remains in full communication with new developments throughout the scientific community including those carried out by other Federal agencies such as USGS. EPA's internal research necessarily occurs in many fields in which the USGS and other Federal agencies have traditionally maintained extensive programs. Coordination to assure complementarity of programs is maintained at all levels, from a formal Interagency Coordinating Committee at Headquarters to informal personal contact among individual scientists working in the field. The present state of the science is such that the need for research far outstrips the total resources which are currently brought to bear by government, the academic community, and private industry. A major task of the interagency effort is to stretch combined resources so that all topics are covered, in addition to avoiding unnecessary duplication.

Responsibilities--USGS

The USGS has traditionally carried out a broad range of investigative activities which have direct bearing on questions of ground-water quality. In the

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area of generic research, USGS scientists have investigated chemical and biological reactions affecting contaminants in the subsurface, have studied the mechanics of flow, dissolved contaminant transport, and immiscible contaminant movement in fully saturated and partially saturated porous media, have developed computer-based models simulating flow, transport, and chemical reaction in the subsurface, have developed parameter estimation techniques for determining the hydraulic characteristics of aquifers, and have developed borehole and surface geophysical techniques for evaluating the characteristics of geologic materials and subsurface fluids. Areal investigations have been discussed previously; but as already noted, such investigations grade continuously into research. In terms of areal hydrology, USGS personnel have evaluated many regions of the Nation as to aquifer characteristics, regional ground-water flow, and general ground-water quality, and have conducted studies of nonpoint-source ground-water contamination. In terms of site-specific field research, USGS scientists have conducted investigations at a number of waste disposal sites, evaluating the degree and extent of contamination, determining through simulation the rates and directions of contaminant movement, and studying the chemical and biological processes affecting the contaminant plumes. The investigative activities outlined above have been funded under the USGS's appropriated programs, or through cooperative arrangements with State and local governments, or to some extent by other Federal agencies. In the future, the USGS will continue to pursue all of the lines of research and investigation described above, and will direct its efforts as needed to accommodate evolving scientific needs related to ground-water quality. At the same time, close coordination with EPA will be maintained to ensure that all needed research areas are adequately covered within respective agency resources and plans.

Responsibilities--EPA

As part of its statutory mandates to protect ground-water quality, EPA pursues a research program directed toward the development and demonstration of suitable waste disposal options; development of the scientific basis for adequately and accurately assessing degree and extent of damage of ground-water quality; and development and demonstration of effective procedures for remedial actions. In this regard, EPA manages both internal and extramural research, development, and demonstration programs in: (1) determining the fate, transport, and transformation rates and mechanisms of pollutants in the subsurface environment including both the unsaturated soil profiles and the saturated zones, (2) defining the processes to be used in characterizing the subsurface environment as a receptor of pollutants, (3) developing techniques for predicting the effects of pollutants on soil and indigenous organisms, (4) defining and demonstrating the applicability and limitations of using natural processes, indigenous to the subsurface environment, for the protection of this resource from municipal, industrial, and agricultural activities entailing the release of pollutants to the soil or deeper regions of the subsurface, (5) developing and demonstrating methodologies and technologies

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for sampling and monitoring ground-water quality from site specific to national scale, and (6) developing and demonstrating engineering alternatives and options for excluding contaminants from the subsurface including process modifications, waste stream control technologies, disposal site liners, and waste encapsulation procedures.

In contrast with USGS's broad mission responsibilities relating to appraising the quality and quantity of the Nation's water resources, EPA's ground-water research is focused on matters related to ground-water contamination.

Cooperative Activities

-- EPA and USGS will share research and related information through such mechanisms as the exchange of research plans, budgets, progress reports, project summaries, and research products.

-- EPA and USGS will undertake discussions to arrange interchange of scientists, both short and long-term, to the extent feasible.

-- USGS and EPA will undertake joint research activities of mutual interest. This could include, for instance, joint funding of contracts and cooperative agreements, transferring personnel or funds on specific projects, or participating together on specific field sites.

-- Research plans will be monitored and coordinated through existing formal mechanisms such as the EPA/USGS Coordinating Committee.

IMPLEMENTATION AND COORDINATION

Implementation of this MOU will be as follows:

1. Overall implementation will be coordinated by the Chief Hydrologist, USGS, and the Director, Office of Ground-Water Protection, EPA. Issues unresolved at this level will be referred to higher levels. To the extent possible, coordination of the activities described by this MOU will be achieved at the lowest practical level.

2. The Chief Hydrologist, USGS, and the Director, Office of Ground-Water Protection, EPA, will use the Ground-Water Policy Subcommittee of the standing EPA/USGS Coordinating Committee, established under the MOU dated August 5, 1981, as a forum for coordination, information exchange, and, as appropriate, resolution of issues. At least once annually, this Subcommittee will review relevant budget initiatives and significant accomplishments.

3. A further point of coordination will be the EPA Interagency Committee on Ground-Water, of which the USGS will be a member.

4. Within the overall framework established by the MOU, more detailed implementation of specific cooperative actions will be the responsibility of various operating units of both agencies. For example, for those activities conducted

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in support of the EPA Office of Waste Programs Enforcement, the coordinators identified in the interagency agreement of October 1, 1983, will be responsible. Research coordination will be the responsibility of EPA's Office of Research and Development and the USGS's Ground Water Branch.

5. Regular meetings between USGS Regional Hydrologists and EPA Regional Directors or their representatives will be held to assist in implementing cooperation between the agencies.

6. Annually, the two agencies will develop an agenda outlining the activities to be conducted in the following fiscal year, and will prepare reports on activities carried out during the current fiscal year under the terms of this MOU.

7. If the USGS carries out a program as part of its mission, it will provide its support to EPA gratis. If EPA requests special assistance such as site-specific assessments from the USGS, such assistance will be arranged for and reimbursed through an interagency agreement. In meeting its scientific and technical needs, EPA will consider the capabilities of the USGS and utilize its assistance to the extent feasible and appropriate. Such assistance would include cooperative studies with the USGS and review of study plans through the Ground-Water Policy Subcommittee to assure that unnecessary duplication of efforts does not occur.

Part II--Activities Related to P.L. 98-434, the High Plains States Groundwater Demonstration Program Act of 1983

Section 5 of P.L. 98-434, the High Plains States Groundwater Demonstration Program Act of 1984, requires that "The Secretary, acting through the Bureau, and the Administrator of the Environmental Protection Agency . . . shall enter into a memorandum-of-understanding to provide for an evaluation of the impacts to surface water and groundwater quality resulting from the ground-water recharge demonstration projects constructed . . . ." Sec. 5 also stipulates that "The Administrator shall consult with the United States Geological Survey and shall make maximum use of data, studies and other technical resources and assistance available from State and local entities in conducting the evaluation." This section of the MOU addresses this requirement; the purpose of this section is to define the agency roles of the U.S. Bureau of Reclamation (USBR), USGS, and EPA, and to identify mechanisms for achieving effective coordination of the interagency efforts. The purpose of this agreement is to carry out the mandate contained in Section 5 of the High Plains States Groundwater Demonstration Program Act of 1983 only, and does not address the respective responsibilities of the National Environmental Policy Act, Section 309 of the Clean Air Act, the Underground Injection Control Program as established under the Safe Drinking Water Act, or any other statutory authorities or responsibilities.

Background--The act requires a minimum of 21 ground-water recharge demonstration sites in the 17 Reclamation Act States. Phase I of the demonstration activity entails planning, evaluation of recharge technology,

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and site selection, and is to be completed within 24 months after enactment of an appropriation act. Phase II of the demonstrations will begin when an appropriation for construction is signed and will entail design, engineering, construction, operation, evaluation, and analysis of the recharge projects. Phase II will have a duration of 5 years, at the end of which time the Secretary will submit a final report to Congress detailing the results of the studies. Section 5 of the act states that ". . . the evaluation of water-quality impacts shall be completed so as to be included in the Secretary's final report to the Congress . . . ."

SCOPE AND RELATION OF AGENCY ACTIVITIES

The USBR has primary responsibility for the provisions of the act, including site selections, project design, construction, and operation of the demonstration projects. As a consequence of Sec. 5 of the act, the USBR will also be responsible for the installation of suitable observation wells at each site, and will provide access to natural or engineered structures for obtaining samples of recharge water or installing automatic recording devices. In addition, the USBR will make available records of the quantities of water actually recharged, together with such technical information as injection pressures or rates, infiltration rates, physical or chemical specifications of recharge-water treatment, and other information as may become necessary for the evaluation of water-quality impacts.

The USGS will consult with the USBR and EPA on the design of suitable monitoring systems at each site, and on the specifications of observation wells, including material, size, and depth. As mutually agreed upon, the USGS will operate the monitoring networks, provide laboratory analyses of water samples, and conduct scientific studies that are relevant to the assessment of water-quality impacts. Examples of such studies would include evaluation of the effects of treated and untreated recharge water on the permeability of the aquifer, and studies to assess the physical, chemical, and biological impacts of the recharge projects on the receiving aquifers and surface waters.

The EPA will be responsible for the overall evaluation and reporting to the Bureau of Reclamation on the impacts of recharge activities on ground-water quality using data and interpretive information provided by the USBR, USGS, and State and local water agencies. USGS and USBR will ensure that data are collected, stored, and managed in a form that will allow efficient analysis and manipulation of data by EPA so as to fulfill EPA's water-quality evaluation responsibilities.

Implementation and Coordination

By necessity, the conduct of the water-quality evaluations will parallel the course of the recharge demonstrations. Due to restricted funding only limited new field work will be possible during much of the Phase I site selection process. As the recharge sites are identified, and the recharge mechanisms selected, a preliminary sampling for ambient ground-water quality will be conducted prior to the start of recharge activity. The agencies

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will develop a mutually acceptable monitoring program for each site, tailored to the particular characteristics of the site and to the nature of the aquifer and recharge water. USBR and USGS will ensure that EPA is fully consulted in the site-selection process of Phase I, and that the concepts of EPA's Ground-Water Protection Strategy are considered when reviewing candidate recharge sites.

The design, construction, and long-term maintenance or closure of monitoring wells will be integrated with the overall site engineering effort of the USBR, and initiation of the monitoring program will be coincident with the start of recharge.

Data collected during the course of the recharge program will be made available to each agency on a regular basis, and where warranted, modifications of the existing monitoring program may be made as mutually agreed. All water sampling and laboratory analysis will be conducted by USBR, USGS, and State and local agencies as appropriate.

As appropriate, the USGS and USBR will assist EPA in the preparation of the final report to Congress.

Owing to the 2-year lead time before the recharge sites are identified, and the complex overlapping of EPA, USBR, and USGS regional jurisdictions, coordination of the joint activities will be at two levels corresponding to Phases I and II of the act. During Phase I, two or more representatives of each agency will be appointed, respectively, by the Administrator, EPA; the Commissioner, USBR; and the Director, USGS. The responsibilities of that group will be to make recommendations to the Assistant Secretary for Water and Science in the following three areas:

-- To define the scope of each agency's technical and reporting responsibility, and to establish basic technical requirements (including quality assurance and quality control considerations) that will be common to all sites.

-- To develop mechanisms for coordination at the recharge demonstration site level. Such mechanism should involve the USBR site manager, the USGS District Chief, and the responsible EPA technical person.

-- To determine agency resource needs for both Phase I and Phase II.

During Phase II, all coordination will be achieved at the site level, with semiannual progress reports provided to the senior coordinating group.

Other Project Involvement

In addition to this specific effort in response to the High Plains States Groundwater Demonstration Program Act of 1983, the previously mentioned 6-member group may, as appropriate, set up coordinating mechanisms between EPA and USBR, for other USBR projects involved with ground-water recharge.

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FINANCIAL ARRANGEMENTS

Each year, EPA and USBR will negotiate a reimbursable agreement for EPA's work on the High Plains and other ground-water recharge projects based on resource needs projected by the interagency work group.

APPLICABILITY, MODIFICATION, AND TERMINATION

This memorandum of understanding shall cover activities of EPA and DOI that are of mutual interest and that pertain to the use and protection of the ground-water environment. This memorandum shall become effective upon signature of both parties and may be amended by mutual consent or terminated by either party upon 60 days' written notice.

APPROVING PERSONNEL

U.S. Department of the Interior:

Robert N. Broadbent — JUN 21 1985

Robert N. Broadbent
Assistant Secretary
for Water and Science

Date

The Environmental Protection Agency:

Henry L. Longest II — JUN 21 1985

Henry L. Longest, II
Acting Assistant Administrator
for Water, and
Chairman, EPA Ground-Water
Oversight Committee

Date

*U.S. GOVERNMENT PRINTING OFFICE: 1986-491-405:20079

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